REVIEW AND EVALUATION OF CONTINGENCY PLANS FOR OIL AND HAZARDOUS SUBSTANCES IN THE UPPER GREAT LAKES REGION

U.S. ARMY CORPS OF ENGINEERS

DETROIT DISTRICT

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The purpose of this study was to update and supplement a contingency plan review conducted for the Corps in 1979 by the St. Lawrence-Eastern Ontario Commission for handling oil and hazardous substance spills on the upper Great Lakes and their connecting channels. Special attention was given to cleanup and control methods described for ice conditions that may exist in the region in winter. The report identifies existing contingency plans in the study area; tabulates amounts, types, and locations of equipment and manpower that exist to implement the plans; describes methods to contain and recover oil in ice conditions; describes spill mitigation plans and techniques to protect natural resources; describes techniques of deflecting oil in swift flowing waters; and describes disposal plans identified in the contingency plans.

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15 November 1986

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INTRODUCTION AND PURPOSE

As operator of the Locks at Sault Ste. Marie, Michigan, the U.S. Army Corps of Engineers is conducting studies to investigate the environmental consequences of extending the navigation season for Lake Superior related traffic from approximately 8 January to approximately 31 January. Navigation, with the possible risk of oil or chemical spills, would then be possible between Lake Superior, and Lakes Michigan, Huron, and Erie until the Lock closure date. Under the extended season, the effectiveness of known cleanup methods under ice conditions becomes much more important because of additional vessel traffic in ice.

The purpose of this study is to update and supplement a contingency plan review conducted for the Corps in 1979 (Contract No. DACW 35-79-R-0042) by the St. Lawrence-Eastern Ontario Commission. Particular tasks were to describe existing contingency plans to handle oil and hazardous substance spills on the upper four Great Lakes (Superior, Michigan, Huron, and Erie) and their connecting waterways (the St. Marys River, St. Clair River, Lake St. Clair, and the Detroit River). Particular attention was paid to cleanup and control methods described for ice conditions as may exist in the region during the colder months.

Specific objectives were to:

a) Identify existing contingency plans in the study areas.

b) Tabulate the amounts, types, and locations of equipment and manpower which exist to implement contingency plans in each area.

c) Describe any methods identified in the contingency plans to contain and recover oil in ice conditions.

d) Describe any spill mitigation plans identified in the contingency plans and any techniques listed in the contingency plans to protect natural resources.

e) Describe techniques identified in the contingency plans of deflecting oil in swift-flowing waters.

g) Describe disposal plans identified in the contingency plans.

ORGANIZATION OF REPORT

This report follows three categories of spill-response organization. The first category presents all federal and international (Canada-United States) plans relevant to response within the Great Lakes area of study. The second level includes a review of all plans held by the U.S. Coast Guard Marine Safety Offices in the Great Lakes region (Coast Guard 9th District). The Captain of the Port (COPT) at each Marine Safety Office (MSO) is designated as the On-Scene Coordinator (OSC) for for spills within the navigable waters of the Great Lakes. (For reference, a listing of the acronyms used in this report is contained in Table 1. The third level presents the oil and hazardous substance contingency plans of each state bordering the area of study. In addition, a private spill cooperative is evaluated in this same section of the report. A summary of available equipment and personnel follows the evaluation of state and private plans. The final section of the report is an analysis of the collected information with regard to the extension of the open-water season within the upper Great Lakes.

METHODS

Contingency plans for oil and hazardous materials were collected from three major sources: federal agencies, U.S. Coast Guard Marine Safety Offices, and state agencies. The principal methods of collecting their plans were office visits, and telephone requests followed by written requests. To insure that we had the latest copies of each plan, verification by telephone was obtained. In addition, telephone and written requests were made for plans from private sources, but with much less success. There is little incentive for them to produce a report for outside review unless legally required to do so.

Equipment and personnel information was collected in two stages. The first stage entailed obtaining the names with contact telephone and address from three sources: the spill

Table 1. Acronyms used in this report.

API	American Petroleum Intstitute
CANUSLAK	Joint Canada-United States Pollution Contingency Plan - Great Lakes
COE	U.S. Army Corps of Engineers
COTP	Captain of the Port
DOC	Department of Commerce
DOD	Department of Defense
DOI	Department of Interior
DOE	Department of Energy
DOJ	Department of Justice
DOS	Department of State
DOT	Department of Transportation
DHEW	Department of Health and Human Services
DOL	Department of Labor
EPA	U.S. Environmental Protection Agency
FEMA	Federal Management Agency
FWS	U.S. Fish and Wildlife Service
MPCA	Minnesota Pollution Control Agency
NOAA	U.S. National Oceanic and Atmospheric Administration
NPS	U.S. National Park Service
NRC	National Response Center
NRT	National Response Team
NYDEC	New York Department of Environment Conservation
OSC	On-Scene Coordinator
PIMEC	Petroleum Industry Marine Environmental Co-operative
RRC	Regional Response Center
RRT	Regional Response Team
SSC	Scientific Support Coordinator
USDA	Department of Agriculture
USCG	U.S. Coast Guard
WDNR	Wisconsin Department of Natural Resources

contingency plans collected above, from state agencies directly (e.g., Michigan), and from outside sources, e.g. the Oil Spill Intelligence Report. The second stage was to confirm, by letter and telephone, the continued existence of each contractor. In many cases, companies listed in even recent plans were found to be no longer present or not doing spill response work. By telephone and letter, information concerning the amount and type of equipment and personnel available was requested. As part of this study, 46 written requests were sent out and over 75 telephone contacts were initially made. Altogether, the names and addresses of over 250 contractors were obtained; of which detailed information on 50 was obtained from telephone interviews (16), mail requests (25), and from recent MSO and other contingency plans (9). Information concerning supervisory and field personnel able employed by each company was obtained by telephone interview. In addition, a recent list of over 350 licensed hazardous waste haulers, which includes many spill-response contractors, was obtained from the State of Michigan and is appended to this report (Appendix I-3).

For this study, tabular formats were developed to evaluate contingency plans and spill-response contractors. The following attributes of each plan were evaluated and noted:

Equipment Information: whether the plan lists either equipment on-hand or available from contractors, or lists the contractors alone (inferring, of course, that they have equipment available).

Containment and Recovery Information: whether the plan describes methods, by diagram or text, to contain and/or recover spilled oil or hazardous substances. This category is subdivided into ice and no ice conditions.

Mitigation Information: whether the plan describes techniques to mitigate damage to natural resources.

Resource Information: whether the plan describes the distribution or location of sensitive wildlife resources.

Deflection of Oil: whether the plan describes methods to deflect and/or control oil in swift-moving currents.

Dispersant-Use Guidelines: whether the plan references a series of guidelines to determine when and if chemical dispersants can be used as a spill-response method.

Removal Techniques: whether the plan describes methods to remove oil from sediments, vegetation, or waterfowl.

Disposal Methods or Sites: whether the plan presents methods to dispose of oil or hazardous materials, or lists sites at which the material may be disposed of.

The summary list prepared to evaluate the capabilities of spill-response contractors includes their location (state or province), types of heavy equipment (bulldozers, graders, front-end loaders, trucks, vacuum trucks, and tank trucks), typical oil-spill equipment (booms, skimmers, sorbents), dispersants (chemical), personnel, boats, and chemical analytical capability. Personnel are subdivided into supervisors and field workers.

RESULTS

FEDERAL AGENCY AND INTERNATIONAL CONTINGENCY PLANS

Overview of the Federal Response Effort

Under the provisions of the Federal Water Pollution Control Act of 1972 as amended by the Clean Water Act of 1977, and Section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, a National Oil and Hazardous Substances Contingency Plan was developed by the Environmental Protection Agency. Section 300.41 of the National Plan states that regional contingency plans shall be prepared for each federal region (Federal Register, July 16, 1982). However, because of the nature of their participation in the response process, several agency plans are national, rather than regional, in scope. (For information, a series of maps illustrating the federal agency regions within the upper Great Lakes is included in Appendix A).

To illustrate the relationship between the different federal agencies, the organizational structure defined by the national contingency plan is presented in Figures 1 and 2. Agency roles and responsibilities within the plan are listed in Appendix 2, with special emphasis on the role of the U.S. Coast Guard as they are the primary response agency for the U.S. Great Lakes. In brief, primary agencies with responsibilities within the Great Lakes, in alphabetical order, are:

U.S. Army Corps of Engineers (COE) - responsible for the operation of locks in the Great Lakes and maintaining the waterways. The COE participates in the response effort primarily as operator of the Sault Ste. Marie lock system. Their response structure and plan is on request.

U.S. Coast Guard (CG) - designated as On-Scene Commander (OSC) for spills in the Great Lakes; provides the Strike Team in special or unusual situations. Their full responsibilities are included with Appendix B. A general organizational structure is presented in Figure 3.

U.S. Environmental Protection Agency (EPA) - designated OSC for inland spills and for long-term operations within the

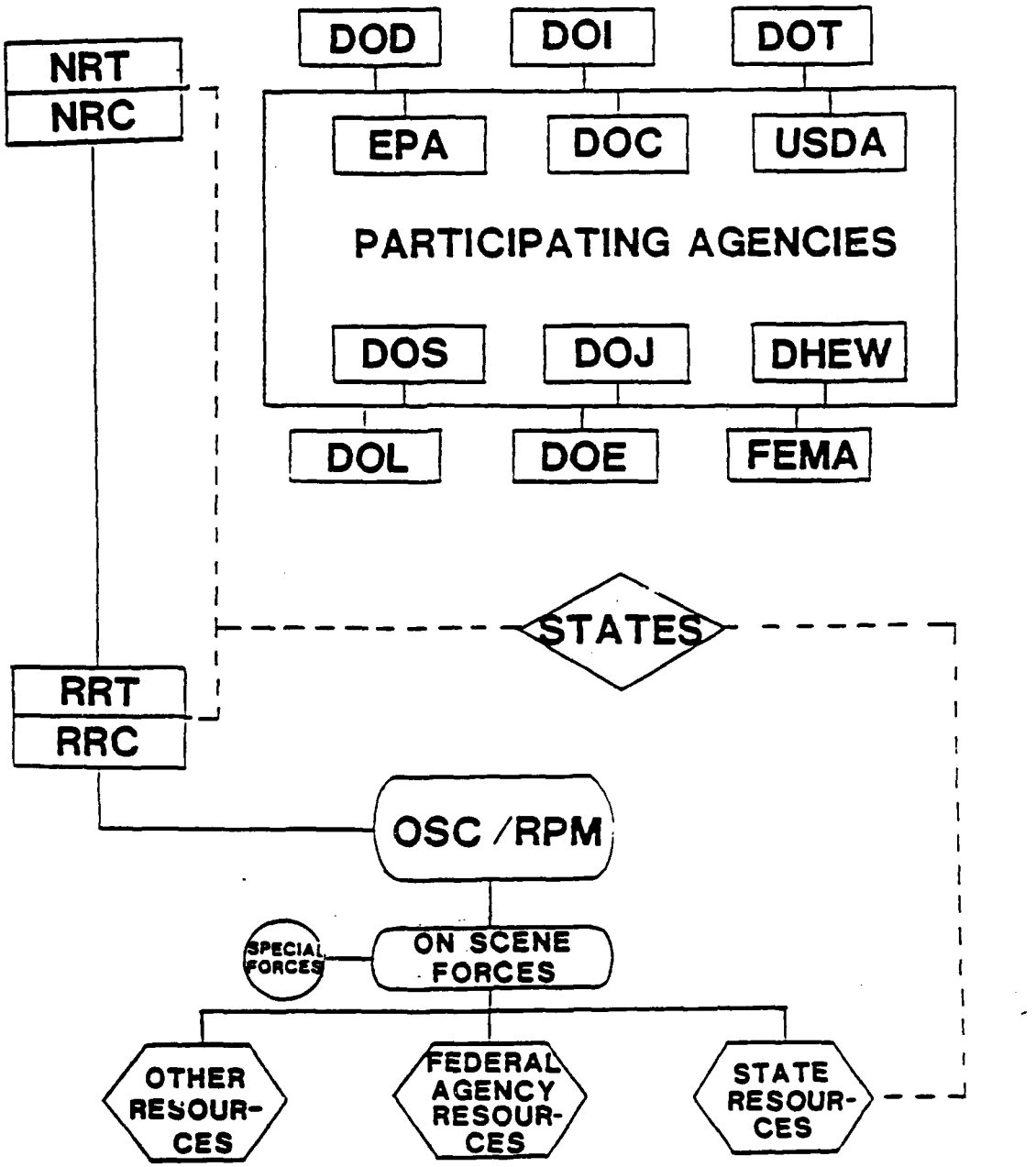


Figure 1. Conceptual organization of the U.S. National Contingency Plan. Acronym definitions are contained in Table 1. Appenix B contains a full description of the positions presented on this figure. (See also Figure 2 for the U.S. spill-response structure.

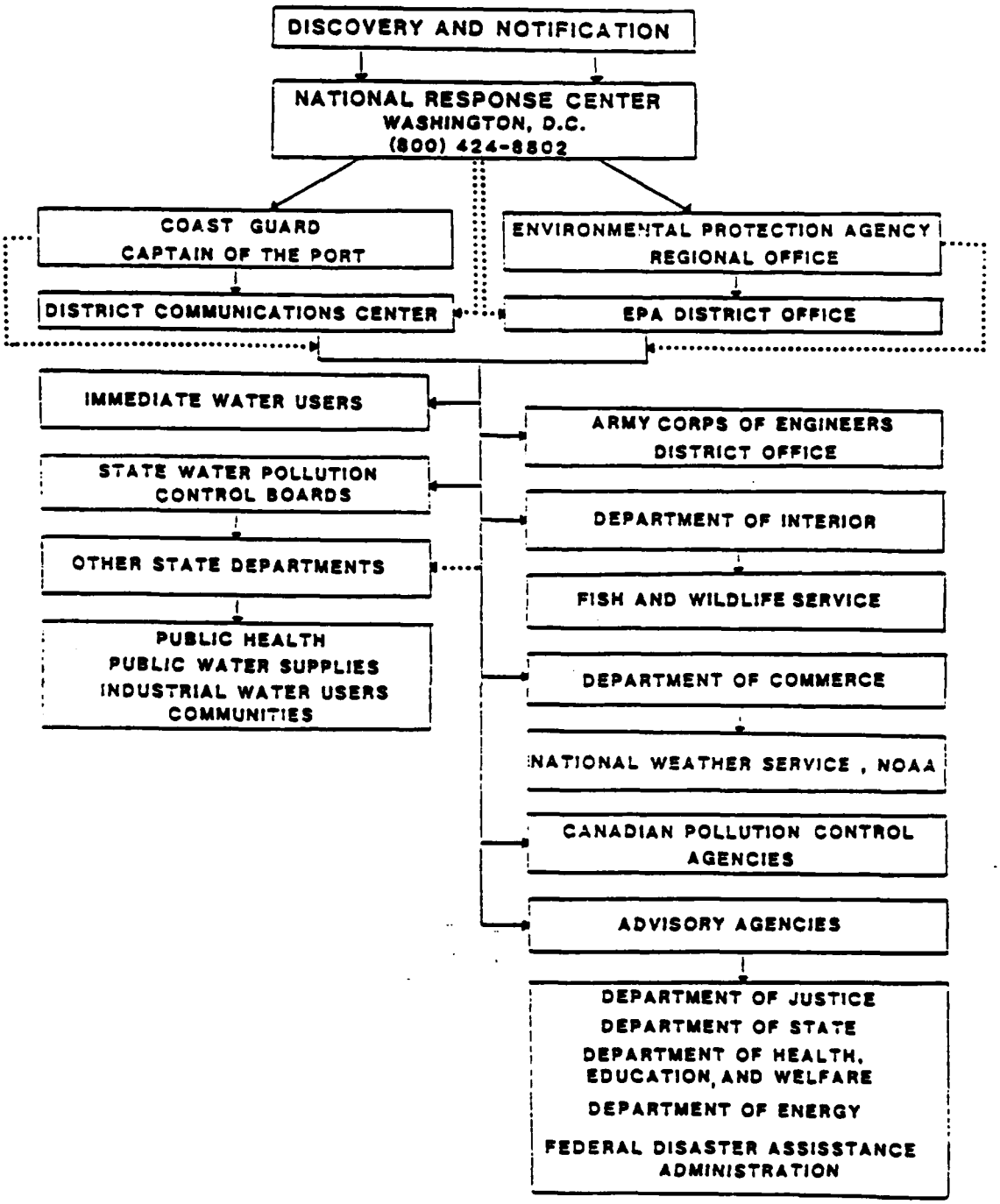


Figure 2. Notification procedure according to the U.S. National Contingency Plan.

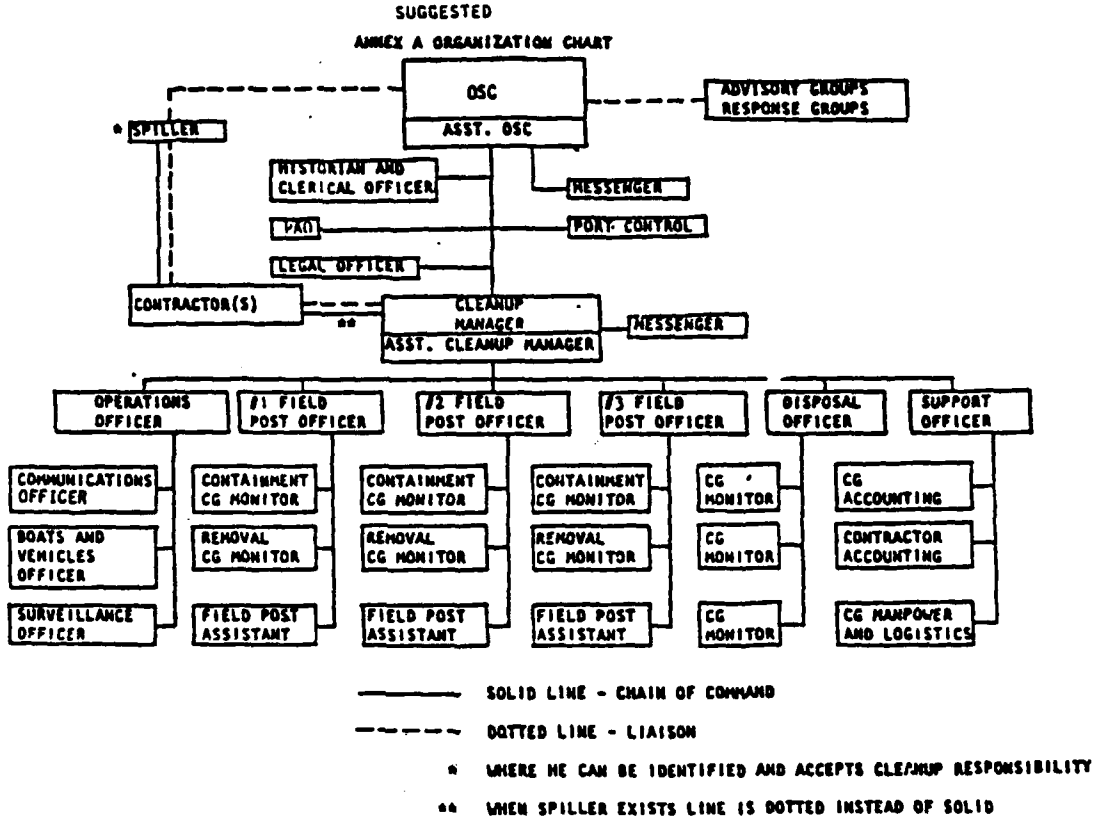


Figure 3. Organization chart for U.S. Coast Guard response to spills of oil and hazardous substances.

coastal fringe; advise and approve dispersant application. The organizational structure is not detailed in their plans, but is presented, in general, in Figure 4.

U.S. Fish and Wildlife Service (FWS) - responsible for national wildlife refuges, advises OSC on wildlife mitigation and treatment. There organizational response structure is presented in Figure 5.

U.S. National Oceanic and Atmospheric Administration (NOAA) - provides the Scientific Support Coordinator (SSC) and ancillary services; e.g., weather forecasts, satellite tracking, trajectory, and modeling.

U.S. National Park Service (NPS) - is responsible for National Park lands within the Great Lakes. As NPS personnel participate almost solely when a spill is within a national park, an organizational structure is not necessary.

In addition to the federal plans, the Great Lakes Water Quality Agreement (Annex 9) between Canada and the United States, designates the Canadian and U.S. Coast Guards as responsible for developing and coordinating response activities under a Joint Canada-United States Marine Pollution Contingency Plan. Under the framework of this joint contingency plan five joint regional plans were developed. The CANUSLAK plan covers the Great Lakes. In turn, a series of supplements were prepared for the St. Clair/Detroit River system, the St. Marys River, and, outside the area of study, the St. Lawrence River. A further discussion of the operations of the international plan, and the overall U.S. and Canadian response operations, is contained in Appendix C. For this evaluation, the Joint Canada-United States Plan, and the two appropriate regional supplements, are reviewed. The federal and international contingency plans that were obtained and evaluated for this project are listed in Table 2.

(a) Organization Chart

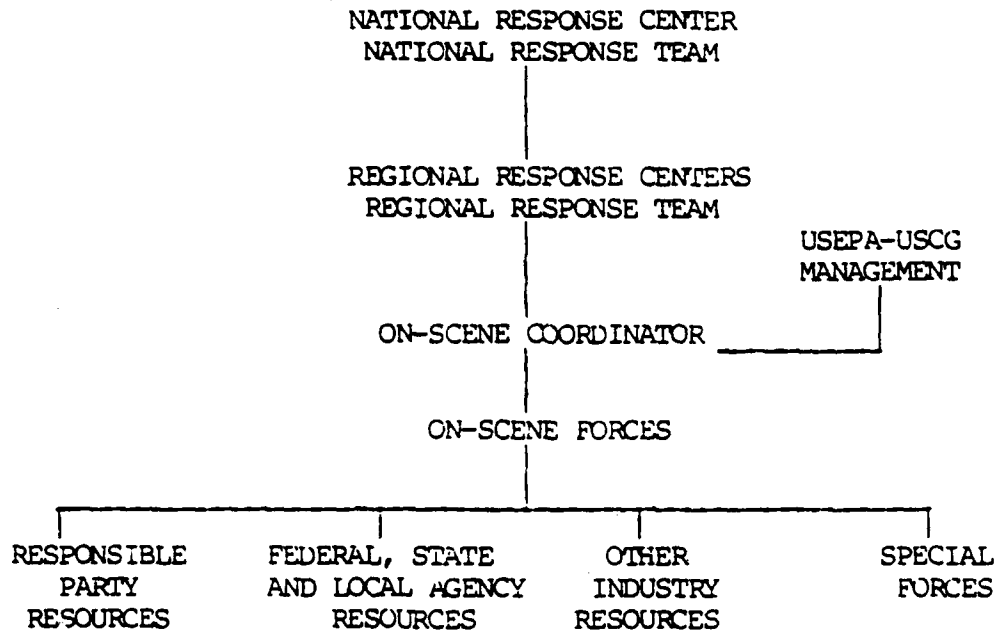


Figure 4. Generalized organization chart indicating role of EPA (and the USCG) as providing the On-Scene Coordinator and providing overall management/coordination during a spill incident.

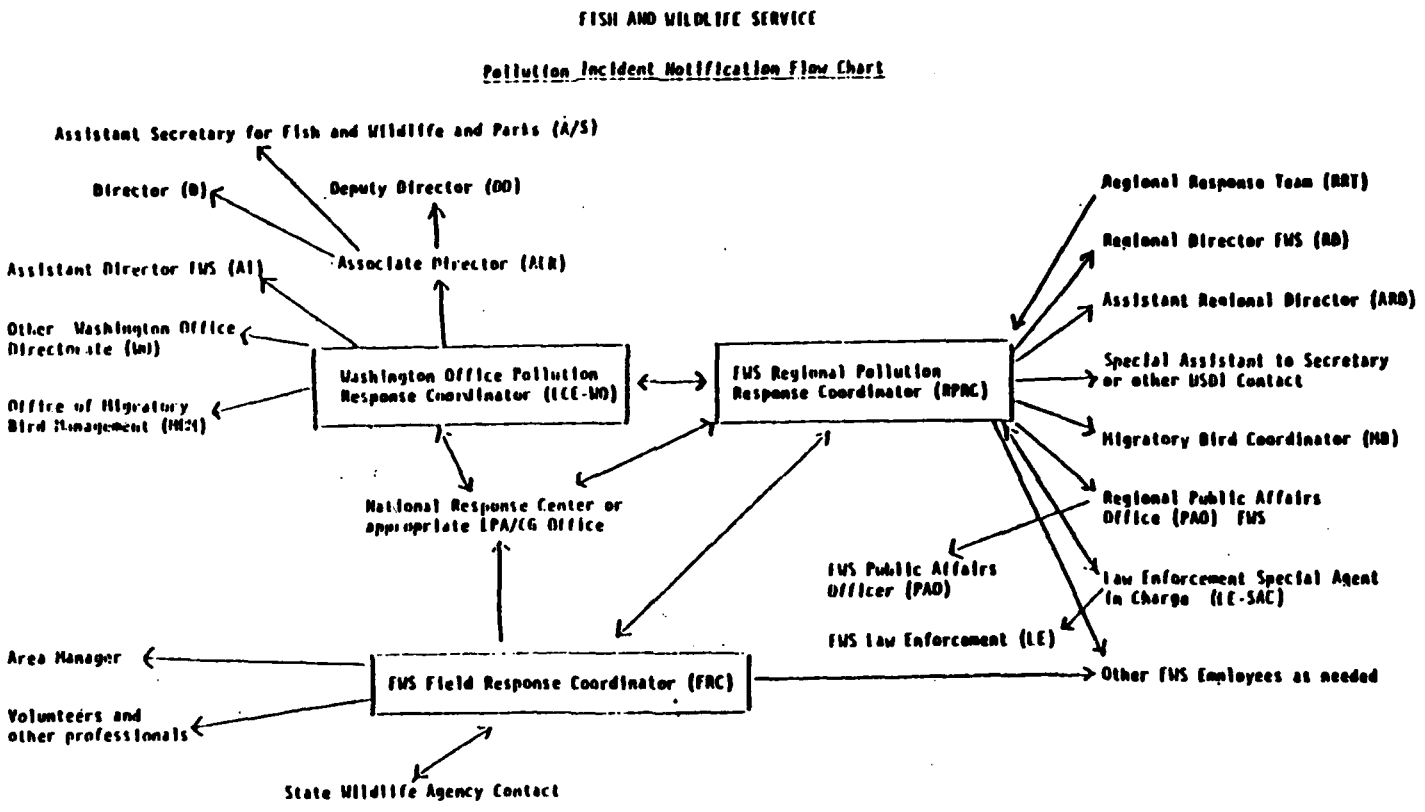


Figure 5. U.S. Fish and Wildlife Service notification chart and generalized response structure.

Table 2. Federal and international contingency plans reviewed. The date of the plan and the telephone and address of a contact person are also presented.

Federal Contingency Plans

U.S. Coast Guard, 9th District
(Plan date: 1985)
Contact: Lt. Burns
1240 E. 9th Street
Cleveland, OH 44199
(216) 522-3918

U.S. Environmental Protection Agency, Region II
(Plan date: 1983)
Contact: Fred Rubel
Woodbridge Avenue
Edison, NJ 08837
(201) 231-6658)

Environmental Protection Agency, Region V
(Plan date: 1986)
Contacts: R.J. Bowden/J. Barnette
Emergency Response Section
230 S. Dearborn Avenue
Chicago, IL 60604
(312) 886-1964

U.S. Fish and Wildlife Service, Region 3
(Plan date: 1980)
Contact: T.J. Miller
Federal Building, Fort Snelling
Twin Cities, MN 55111
(612) 725-3536

U.S. Fish and Wildlife, Region 5
(Plan update: 1983)
Contact: Adam Julin
1 Gateway Center, Suite 700
Newton Corner, MA 02158
(617) 965-5100 ext 379

U.S. National Oceanic and Atmospheric Administration
(Plan date: 1984)
Contact: Ted Kaiser
Scientific Support Coordinator
Hazardous Materials Response Branch
2300 Washtenaw Avenue
Ann Arbor, MI 48104
(313) 668-2069

Table 2. Federal and international plans (continued).

U.S. National Park Service
(Plan date:in review)
Contact: Warren H. Hill
Midwest Regional Office
1709 Jackson Street
Omaha, NE 68102-2571
(402) 221-3475

Joint Canada-United States Plans

Canada-United States Joint Marine Pollution Contingency Plan
(Plan date: 1983)
Contact: Wilma Godon
Regional Emergency Operations Officer
Canadian Coast Guard, Central Region
1 Yonge Street, 20th Fl.
Toronto, Ontario M5E 1E5
(416) 973-2283

Detroit - St. Clair Supplement
(Plan date: 1986)
Contact: Wilma Godon
Regional Emergency Operations Officer
Canadian Coast Guard, Central Region
1 Yonge Street, 20th Fl.
Toronto, Ontario M5E 1E5
(416) 973-2283

St. Marys River Supplement
(Plan date: in review)
Contact: Wilma Godon
Regional Emergency Operations Officer
Canadian Coast Guard, Central Region
1 Yonge Street, 20th Fl.
Toronto, Ontario M5E 1E5
(416) 973-2283

Agencies for which copies of their plan did not arrive in time for this review are:

U.S. Army Corps of Engineers, Detroit District
Contact: John R. Collis
Sault Ste. Marie Locks
Emergency Management Branch
Box 1027
Detroit, MI 48231
(313) 226-3345
(Harold Lawson 906-632-3311)
Contact date: 22 September 1986

Summary

A summary of the federal and international contingency plans evaluated is presented in Table 3. In reviewing these plans it is clear that on the federal and international level, the contingency plan primarily focuses on legal mandate, organizational structure (particularly in relating to other agencies), financial compensation, and contact phone numbers. Only the Fish and Wildlife plans contain any mention of equipment, and in this case it naturally deals with wildlife-related equipment (e.g., bird-hazing noise makers). In general, the containment/recovery of spilled material is not mentioned in federal plans, although the National Park Service (draft) plan breaks the rule and contains numerous sketches on ways to deploy boom and other devices to recover and contain the substance and to mitigate potential environmental damage. Resource information is lacking on this level, which is logical if the whole of the U.S. is to be considered. Fish and Wildlife Service, Region 3, does contain a listing of endangered and protected species, and their resident habitat. On the very local, though international level, the regional supplements (St. Marys River and St. Clair/Detroit River system) do contain very specific wildlife and recovery-site information, as well as guidelines for oil spill removal and disposal. (These supplements are accompanied by a series of environmental sensitivity maps. For this review, the maps are considered as part of the supplement, and are available from the Canadian Coast Guard or NOAA). EPA Region V, the NOAA federal plan, and the CANUSLAK supplements provide guidance on the use of dispersants.

Equipment Information. The Fish and Wildlife Service (Regions 3 and 5) contingency plans are the only ones containing any reference to response equipment, whether it be contractors or on-hand supplies. In the Region 5 plan, all equipment is referenced toward the supply of wildlife-related materials. Examples include suppliers of: Lux Liquid Amber (for bird cleaning), plastic colored leg bands, exploding shells and sound devices (for bird hazing), and pyrotechnic devices (for

Table 3. Summary of the federal and international contingency plans evaluated within the project terms of reference. Table 2 contains the full name of each plan.

Agency	Equip	Cont.Recov ice/no ice		Mitig	Res	Defl	Dsper	Remov	Dspos
CG -9TH	no	no	no	no	no	no	no	no	no
EPA -II	no	no	no	no	no	no	no	no	YES
EPA -V	no	no	no	YES	no	no	YES	no	no
FWS -3	YES	no	no	no	YES	no	no	YES	no
FWS -5	YES	no	no	no	YES	no	no	YES	no
NOAA -US	no	no	no	no	no	no	YES	no	no
NPS -US	no	no	YES	YES	no	YES	YES	YES	YES
CAN-US	no	no	no	no	no	no	no	no	no
CANUSLAK	no	no	no	no	no	no	no	no	no
ST.CLAIR	no	no	YES	YES	YES	YES	YES	YES	YES
ST.MARYS	no	no	YES	YES	YES	YES	YES	YES	no

Equip = equipment on hand or suppliers.
Cont.Recov = a description of methods to contain or recover spilled material in ice and no ice conditions.
Mitig = techniques to mitigate damage to natural resources.
Res = location of sensitive natural resources.
Defl = methods to deflect oil in swift-flowing currents.
Dsper = dispersant-use guidelines.
Remov = methods to remove oil from sediments, vegetation, or waterfowl.
Dspos = guidelines for disposal or a listing of disposal sites.

wildlife control). The Region 3 plan is different in that it lists the equipment on-hand within the FWS spill response trailers located in La Crosse, Wisconsin, and Sandusky, Ohio. Typical equipment includes boots, coveralls, safety goggles, Amber Lux Liquid detergent, and first aid kits.

Containment and Recovery Information. For the most part, the federal plans contain no reference to any containment or recovery techniques. On the federal level, the National Park Service plan is the exception. It contains a total of 22 diagrams indicating methods to contain oil in various stream and open-water situations. The illustrated techniques include use of booms in fast-flowing streams, along an open shoreline, and in open waters. Other diagrams are for construction of improvised booms with straw and filter fences to collect oil from narrow channels (see Appendix D). The NPS plan also presents two diagrams plus an explanatory text to illustrate effective ways to recover oil. In the text, several mechanical methods are discussed: skimming and slurping, floating suction heads, round floating weirs, rotating drum or disk, oleophillic belts, bent steel and back hoe, and use of oleophillic sorbents. Reference to ice-dominated situations is not given in this document nor in any other plan at this level.

On the regional, although international level, the supplements to the CANUSLAK plan provide diagrams with explanations concerning the placement of booms. Winter ice conditions are mentioned but no explanation with respect to containment or recovery in ice is given. Methods to recover the oil or hazardous substance from the environment are also not given in these plans.

Mitigation Information. Methods to mitigate environmental damage are presented in several plans. The NPS plan briefly outlines several oil-spill countermeasures including physical containment, physical mixing, chemical removal, use of sorbent pads, stream bank cleanup, and flushing (Appendix E). The CANUSLAK supplements present ways of placing booms or other

control devices. In addition and under separate cover, the CANUSLAK supplements contain a series of detailed environmental sensitivity maps for which the accompanying text presents brief guidelines for handling spills within the shoreline types found within the Great Lakes.

Although not directly presenting mitigation techniques, the EPA Region V plan contains brief discussions on the use of chemical agents (discussed in greater detail under dispersants), and the use of effective harassing techniques to remove birds from (or discourage them from entering) an affected habitat.

Resource Information. Only three plans, Fish and Wildlife Service - Region 3 and the two CANUSLAK regional supplements (St. Marys River and St. Clair/Detroit River system, present information on resources necessary to protect during a spill incident. The FWS lists the location of all endangered (and proposed endangered) species within Regions 3 and 5 by county. The CANUSLAK plans with sensitivity maps (under separate cover) presents a series of maps highlighting the location and seasonality of sensitive wildlife within their study area. In addition, recreational and socio-economic (parks, marinas, water-intake sites) resources are also indicated on the included map series.

Deflection of Oil. Only the CANUSLAK supplements and the NPS plan review methods to deflect oil in swift-moving currents (Appendix F). In common, all plans present diagrams as to the proper angle of deflection and anchoring techniques. The CANUSLAK supplements take it a step further by listing potential recovery sites and presenting river characteristics (flow velocities and water depths) for those sites.

Dispersant-Use Guidelines. NOAA has the most complete listing of dispersant-use criteria, presenting a three-page listing of appropriate information to aid the evaluation as to whether to apply chemical dispersants. The EPA-Region V plan states that the state of knowledge concerning dispersants is not yet

sufficient to permit their routine usage. Therefore, the OSC is only authorized to consider dispersants on a case by case basis. Guidelines for this decision are not presented by EPA; however, all dispersants currently approved for possible use in U.S. waters are listed.

Other plans that provide basic information on chemical agents are the NPS plan and the CANUSLAK supplements. The NPS plan focuses on chemicals for control of soluble hazardous materials, briefly describing the following chemical additives: cheatine, complexing, and precipitating agents; neutralizing agents; and Chemisorotion. The supplements present general advantages and disadvantages concerning (oil) dispersant application, the agencies responsible for approval, and a listing of dispersants approved by the United States EPA and Environment Canada.

Removal Techniques. The NPS plan and CANUSLAK supplements have the most complete sections on removal techniques. The NPS plan describes removal of a substance from a stream bank and provides a general warning against simple flushing techniques (Appendix E). The sensitivity maps accompanying the CANUSLAK supplements contain guidelines for removing in terms of shoreline type. The Fish and Wildlife Service (Regions 3 and 5) plans present a brief overview of the methods for treating and cleaning oiled birds (Appendix G).

Disposal Methods or Sites. The EPA-Region V plan presents a single page concerning disposal and stating their preference for using reclamation methods for both oil and hazardous materials. The EPA-Region II plan lists facilities that store, treat, or dispose of hazardous wastes. The NPS plan briefly describes the following disposal techniques: recycling, incineration, burial, land burial, and natural degradation. The CANUSLAK supplement for Detroit-St. Clair River system provides a listing of Canadian disposal sites and treatment facilities as of 1983. Other plans do not refer to disposal techniques or sites.

Review of Individual Plans

U.S. Coast Guard - 9th District. The contingency plan for the 9th district of the Coast Guard contains: operational authority, definitions, responsibilities (U.S. and with Canadians), phone and address contacts in state and federal agencies, maps of federal agency boundaries, USCG - EPA boundaries for appointment of the On-Scene Coordinator, a copy of the operating agreement between the Canadian and U.S. Coast Guards concerning aerial and surface surveillance for pollution enforcement, and a copy of the USCG-EPA memorandum of understanding.

U.S. Environmental Protection Agency - Region II. This plan contains its operating authority, policy, and responsibilities, definitions, organizational structure with designated response operations, contingency plans by other agencies, funding considerations, designations of area of responsibility, a list of contacts and of facilities that handle hazardous waste.

U.S. Environmental Protection Agency - Region V. This plans contains its operating authority, policy, and responsibilities, definitions, a directory of contacts (including wildlife groups), areas of responsibility, an alerting procedure, cleanup guidelines and policies, EPA-accepted dispersants, policy toward participation of non-federal groups, guidelines toward bird hazing, and reference to state contingency plans with contacts,

U.S. Fish and Wildlife Service - Region 3. This contingency plan for Region 3 contains: background authority, definitions, a contaminant discharge log, a response assessment log, a daily performance record, an oiled bird care log, cost recovery guidelines, methods to handle and report endangered and threatened species, regional state and federal contacts including volunteer groups and animal welfare organizations, the locations of endangered species in Region 3, an inventory

of equipment held in the FWS response trailers, methods for radio-communicating, methods for cleaning oiled birds, and volunteer management guidelines.

U.S. Fish and Wildlife Service - Region 5. This plan contains the same material as the Region 3 plan with the addition of regional maps indicating the locations of regional pollution response coordinators, field response coordinators, and area headquarters,

U.S. National Oceanic and Atmospheric Administration. The NOAA plan is also national in scope. It contains a directory of contacts, operational offices and services, reimbursement procedures, dispersant-approval guidelines, and a copy of the National Oil and Hazardous Substances Contingency Plan.

U.S. National Park Service. This plan is national in scope and contains authorization and responsibilities, definitions, a directory of contacts, techniques for containing and recovering spilled oil, countermeasures to control a hazardous substance spill, cleanup and disposal methods, documentation and cost recovery, and available information sources.

Canada-United States Joint Marine Pollution Contingency Plan. This plan is between the United States and Canada and governs all border regions (Great Lakes, Atlantic Coast, Pacific Coast, Beaufort Sea Coast and Dixon Entrance). The plan contains purpose, objectives, scope, definitions, policy, responsibilities, response operations, reporting and communication requirements, and methods for public information.

CANUSLAK (Joint Canada-United States Pollution Contingency Plan - Great Lakes). This plan is a regional annex to the above plan and is solely concerned with coordination of U.S. and Canadian spill response activities in the Great Lakes region. The plan contains designation of responsibility areas, centers of operation, On-Scene Coordinators,

definitions, a copy of the Canada Shipping Act, and a list of vessels in compliance (1983) with the Act.

Detroit-St. Clair River Supplement to CANUSLAK. This plan is a local supplement to the regional plan between the United States and Canada. It contains an introduction, purpose, definitions, alerting procedures for Canada, response considerations, a physical description of the environment including winter conditions and water-use activities, booming and containment methods, disposal and dispersant guidelines, a directory of contacts, an ecological sensitivity area inventory (map and text), water intakes (map and text), disposal sites in Canada, hydraulics of the river (map and text), potential recovery sites (map and text), water access facilities (map and text). As an appendix to this plan, a series of 1:40,000 (approx.) maps were prepared highlighting sensitive shoreline types, wildlife areas (with season), water-intake sites, power plants, and recreational areas. The short text accompanying the maps presents guidelines for removing oil from each shoreline type.

St. Marys River Supplement to CANSUSLAK. This contingency plan is in review and will contain the same types of information described in the above plan. It also contains a series of environmental sensitivity maps as an appendix.

PLANS OF THE USCG MARINE SAFETY OFFICES

Overview

In the Great Lakes Region, Coast Guard District 9, the Captain of the Port (COTP) for each Marine Safety Office (MSO) is designated as the OSC for spills of oil or hazardous substances within the designated USCG zone of jurisdiction. For this district, the MSOs are Buffalo, Chicago, Cleveland, Detroit, Duluth, Milwaukee, Muskegon, Sault Ste. Marie and Toledo. The exact area of responsibility has been decided between the EPA and USCG and is contained in the EPA and USCG-9th District contingency plans (see the previous section of this report). Any discharge into navigable waters is invariably handled initially by the USCG. In cases involving the chronic release of material, management of the site is turned over to the EPA. Because the MSO most often responds to spills in the Great Lakes, each one has a contingency plan and is evaluated below. Table 4 contains the full name of each plan with a contact name, telephone number, and address.

Summary

Table 5 summarizes the review of MSO plans. These plans follow the same format in their statement of national, international, and state policies; their jurisdictional boundaries and responsibilities; cooperation with other agencies; and organizational resources for spill response. Response procedures are very detailed in some cases with specimen action sheets and checklists (Detroit, Sault Ste. Marie, and Buffalo). A generalized structure for USCG response has been presented in Figure 3. Transportation patterns vary from very brief (Muskegon) to detailed (Toledo) and with maps (Duluth and Milwaukee). Hydrological and meteorological considerations are very brief and mention the same ice coverage season, except in the case of Detroit where trajectory models have been developed for air and water flow patterns (with maps of seasonal flow patterns from which travel times can be calculated).

The spill response phase of each plan is not treated homogeneously between MSOs. In some cases, this material is

Table 4. Contingency plans of USCG Marine Safety Offices (MSOs) reviewed as part of this project. The date of the plan and the telephone and address of a contact person are also presented.

Buffalo MSO
(Plan date: 1985)
Commanding Officer, USCG MSO
(Contact: Mr. Kurt Benson)
1111 Federal Building
111 W. Huron Street
Buffalo, NY 14202

Chicago MSO
(Plan date: 1979)
Captain of the Port
Contact: Lt. Ives
USCG MSO
610 S. Canal Street
Chicago, IL 60607
(312) 353-1226

Cleveland MSO
(Plan date: 1982; updated 1986)
Contact: Petty officer Marcia Hisel
1055 E. 9th Street
Cleveland, OH 44114
(216) 522-4405

Detroit MSO
(Plan date: 1986)
Contact: Commanding Officer
2660 E. Atwater Street
Detroit, MI 48207
(313) 226-7777

Duluth MSO
Plan date: 1981; last ammend., 1984)
Commanding Officer, USCG MSO
Contact: Lt. Blunt
Canal Park
Duluth, MN 55802
(218) 720-5285
(218) 727-6692

Milwaukee MSO
(Plan date: 1986)
Contact: Lt. Redig
2420 S. Lincoln Memorial Drive
Milwaukee, WI 53207
(414) 291-3788

Table 4. MSO plans (continued).

Muskegon MSO
(Plan date: 1979)
Captain of the Port
Contact: BM1. Innes
USCG MSO
Fulton Avenue and Bluff Street
Muskegon, MI 49441
(616) 759-7183

Sault Ste. Marie MSO
(Plan date: 1986)
Contact: Captain of the Port
USCG Group
Sault Ste. Marie, MI 49783
(906) 635-3220

Toledo MSO
(Plan date: 1986)
Commanding Officer
Contact: Petty Officer Pagano
USCG MSO
Rm. 501 Federal Building
234 Summit Street
Toledo, OH 43604
(419) 259-6372

Table 5. Summary of the USCG Marine Safety Office contingency plans evaluated within the project terms of reference. Table 4 contains the full name and date of each plan.

Agency	Equip	Cont.Recov ice	Cont.Recov no ice	Mitig	Res	Defl	Dsper	Remov	Dspos
BUFFALO	YES	no	no	YES	YES	YES	no	YES	YES
CLEVELAND	YES	no	no	YES	YES	YES	no	no	YES
CHICAGO*	YES	no	no	no	no	no	no	no	YES
DETROIT	YES	YES	YES	YES	no	no	no	no	YES
DULUTH	YES	no	no	YES	YES	no	no	no	YES
MILWAUKEE	YES	no	YES	YES	YES	**	no	**	YES
MUSKEGON	YES	no	YES	YES	YES	YES	YES	no	YES
STE.MARIE	YES	YES	YES	no	YES	YES	YES	YES	YES
TOLEDO	YES	no	YES	no	YES	no	no	YES	YES

*based on annexes of Chicago MSO plan. Full plan is on request.
**reported as on file at the Milwaukee MSO.

Equip = equipment on hand or suppliers.
Cont.Recov = a description of methods to contain or recover spilled material in ice and no ice conditions.
Mitig = techniques to mitigate damage to natural resources.
Res = location of sensitive natural resources.
Defl = methods to deflect oil in swift-flowing currents.
Dsper = dispersant-use guidelines.
Remov = methods to remove oil from sediments, vegetation, and waterfowl.
Dspos = guidelines for disposal or a listing of disposal sites.

kept on file at the MSO office, or reference is made to the 9th District plan or spill-response handbooks. In general, response techniques are not well described although this appears intentional to avoid creation of an unwieldy document. The only plan with some consideration of response techniques in ice conditions is that of Sault Ste. Marie. A telephone interview with the Sault Ste. Marie MSO revealed that the response techniques described for ice conditions are not yet available to them; however, in at least two cases contractors removed spilled petroleum product from an iced situation. The details of the cleanup method were not available. It was stated that expertise could be expected from the Canadians and the Atlantic Strike Team.

Sensitive natural resources are sometimes described in great detail, with separate data sheets on each resource, and occasionally detailed maps (Buffalo and Toledo), indicating locations of transfer, storage and processing facilities, marinas and yacht clubs, beaches and wildlife areas, parks water intakes, sensitive and endangered species, and response techniques. The Detroit plan references the regional shoreline sensitivity maps available through NOAA which present many of the above-mentioned features at a scale of 1:24,000.

The various plans either provide directories or refer to in-house files of cleanup contractors with listings of available equipment, haulers, and disposal sites for oil and hazardous substances. Data sheets are provided to describe the location and content of various facilities working with hazardous substances. Guidelines for dispersant use are presented only in the Sault Ste. Marie and Muskegon plans.

Equipment Information. Recent MSO plans (Buffalo, Sault Ste. Marie and Detroit) contain the most complete information concerning contractors with available spill-response equipment. Plans older than about three years are too out-of-date concerning phone numbers, addresses, and available equipment to be reliable. The Muskegon plan merely contains a short list with phone numbers only. Three of the seven groups

are no longer in this business. The Chicago and Cleveland MSO plans also list contractor name and phone number. The Toledo plan presents an address and phone number with a minor heading indicating the contractors' capabilities.

Containment and Recovery Information. The Sault Ste. Marie contingency plan is the only MSO plan which mentions the use of commercial containment booms and other special techniques (ice-oil boom, arctic boom, deep-skirted boom, ice trenching, ice keel, containment pocket, and bubble barrier) for possible application in ice situations. The mechanical recovery of oil by various skimmers (weir, belt, disc, drum, and vortex types) is also discussed for arctic conditions. Non-mechanical recovery techniques, such as in situ burning, biodegradation, surface-collecting agents, dispersants, and sinking agents) are also evaluated. Their entire section on response in ice conditions is reproduced in Appendix H. As discussed previously, particular ice-related cleanup machinery is not available locally. Other MSO plans present inventories of cleanup contractors and equipment without reference to equipment performance in ice conditions.

Mitigation Information. The most detailed information concerning methods to mitigate environmental damage is within the Buffalo MSO plan were specific actions are described for mapped sections of the shoreline. The section maps include bird and wildlife refuges, beaches, parks, marinas, and tourist recreation sites. Other than this plan, specific mitigation techniques are not mentioned except in reference to bird-hazing techniques (e.g., use of propane cannons, aerial explosives, etc.) in the plans for Toledo and Buffalo. Reference to the "Saving Oiled Seabirds" manual is also made in the Toledo plan. Upon enquiry, it was ascertained that this publication is not available at the Toledo MSO. Further discussion with the publisher, the American Petroleum Institute (API), revealed that this 1978 publication is out of print, and has been replaced by the 1985 publication entitled "Rehabilitating Oiled Seabirds - A Field Manual" (API Publ. No. 4407).

Although specific techniques are not stated, many plans contain resource information and thereby infer that damage would be reduced if these areas were protected.

Resource Information. All the MSO plans contain resource-related information. For the most part, they include the locations of water intakes, petroleum-storage facilities, beaches, parks, wildlife areas, spawning areas, and endangered species. Most of the MSO plans present the information in map form. Exceptions are Sault Ste. Marie, which lists them as to name, location, and nature of resource; Milwaukee which has a prioritized list on file (not reviewed here); and Detroit which refers to the shoreline sensitivity maps sponsored by NOAA for the entire south shore of Lake Erie. Buffalo presents a map series accompanied by a detailed directory annex containing the habitat and seasonality for fish, mammals, amphibians, and birds. The plans also refer to FWS and NOAA as a source of advice. (As of 1986, the NOAA-sponsored shoreline sensitivity maps were completed for St. Marys River; St. Clair River, Lake St. Clair, and the Detroit River; the eastern shore of Lake Michigan; the U.S. shoreline of Lake Erie; and for the St. Lawrence River.)

Deflection of Oil. Techniques to deflect oil in swift-flowing waters are illustrated by diagrams (Muskegon) and by a table presenting boom angle versus current speed to reduce the net velocity to less than 1.3 knots (Buffalo, Muskegon, Sault Ste. Marie, and Toledo) (see also Appendix F). In the Cleveland plan, deflection booms are specifically recommended in the contingency plan for certain shoreline facilities. Although no plan pays specific attention to this problem, it is implicit that the OSC would apply the appropriate technique to the case in question.

Dispersant-Use Guidelines. All plans contain the general statement that the use of dispersants is subject to approval from EPA, except in emergency situations when the OSC may approve it directly (although the reality of this is highly

unlikely). The Buffalo plan states that foreign vessels must be notified not to use dispersants they may have on board during a spill incident. The Sault Ste. Marie plan discusses the effect of very cold temperatures in increasing three-to-four times the amount of dispersant usually required, and the high costs involved in application. No specific guidelines are provided as to the appropriate situation for using dispersants, in warm or cold water conditions.

Removal Techniques. No plan provides specific instructions or guidelines concerning oil removal from sediments. The Sault Ste. Marie plan, however, does list equipment types for beach cleanup (favoring front-end loaders) and recommends horses for wetland areas.

Plant cleaning is mentioned only in the Sault Ste. Marie plan, where cleaning by pressurized water is favored, with reservations.

For removing oil from waterfowl, the plans defer to the FWS, which is responsible for supervising waterfowl protection efforts. The Buffalo plan notes that the Regional Response Team can be partly activated for large-scale cleanup operations. The Toledo plan references the "Saving Oiled Seabirds" manual. Bird cleaning stations are explicitly identified in the Toledo and Buffalo plans.

Disposal Methods or Sites. This aspect is well-treated in all MSO plans. A directory of licensed haulers, and the substances handled by each, is commonly provided. The following three cases are illustrative of the attention paid to this problem.

The Sault Ste. Marie plan discusses several disposal methods including salvage (delivery to refinery and reinjection into a pipeline), and, particularly for ice conditions, incineration(open flame, rotary kiln, and open-pit burners). Burying, landfill, tilling, excavation, and natural disposal (oxidation, evaporation, and biodegradation) are also discussed. Three disposal sites are listed, although others are available in the MSO office.

The Cleveland plan lists services provided and materials accepted by commercial hazardous waste processors and brokers. It also discusses waste disposal by deep well injection, incineration, land disposal, and recycling.

The Buffalo plan states that EPA requirements must be satisfied for the disposal of hazardous wastes. Petroleum products are not considered hazardous unless the flash point is less than 140 degrees F., although the OSC may temporarily waive this classification during an emergency response. Disposal sites must be approved on a case-by-case basis at approved sites. Lists of disposal sites and contractors handling disposal are provided.

Review of Individual Plans

MSO Buffalo. This plan has contains an explanation of federal, state, and international policies concerned with spills; transportation patterns for oil and hazardous substances described for vessels, railroads, and pipelines; transfer and storage facilities; and hydrology and climatology with a brief mention of ice conditions.

Additional information contained is an organizational charted with specific responsibilities; report forms; maps of jurisdictional boundaries, guidelines for documenting a spill incident; cleanup guidelines favoring the use of sorbents, skimmers and other mechanical means rather than the use of chemicals with a brief mention of the use of booms, skimmers/vacuum units, sorbents, manual recovery, dispersal and herding agents, and steam cleaning. A long list of cleanup contractors is provided. Disposal methods are discussed for oil and hazardous substances. Agents and disposal sites are listed. Bird and wildlife treatment by both FWS and volunteers is discussed. Bird treatment centers are noted and methods of hazing are provided.

A lengthy geographic directory is attached as Annex XV and contains important detailed information (maps, directions, specimen forms, phone numbers) relevant to spill response. The annex covers six geographical sub-areas and contains information on facilities (e.g., refineries, industrial

plants), staging sites, environmentally sensitive area, beaches, parks, marinas, water intakes, and major airports. Species of fish, mammals, amphibians, and birds are tabulated along with their habitat and seasonality.

A shore annex is devoted to hazardous substance spill response, giving the responsibilities of the USCG and the EPA, and listing the chemicals with the highest potential for accident in the Buffalo area.

In this plan, a total of 14 cleanup contractors is listed; however, most are outside the area of study. Those located within the area of concern (AMO Pollution Services, CECOS Environmental, and Jabe Construction) are included in Table 8 and Appendix I-1.

In spite of the comprehensiveness of the report, it does not address spill response under ice conditions.

MSO Chicago. The complete 1979 Chicago plan was not available from the MSO, and is considered non-operational by the MSO. A final draft of the new version is currently being prepared and is due to be completed in December 1986. It will deal only with oil spills, and will not include hazardous materials. No considerations of ice conditions will be provided. No operational list of constractors is currently available. Howev er, several annexes to the plan were obtained and are reviewed here. The section of the plan missing, however, contains organizational structure, policies, procedures, etc.

The annexes reviewed contain a response directory including federal, state, and local agencies and the scientific community (the name and phone numbers of nine individuals from private companies, government, and universities). Pollution contractors with services are also provided. Categories of service include dispersants, surface collecting agents, biological agents, burning agents, pumps, hoses, self-contained transfer systems, lightering systems, vacuum trucks, pump trucks, safety equipment, special clothing, and spill cleanup inventory systems.

Other information incorporated in the annex includes: pollution cooperatives; waste disposal sites; an incident

response checklist; a hazardous waste services directory; and information sheets on facilities that handle oil and hazardous materials (listing type, amount, storage sites, etc.).

MSO Cleveland. This plan begins with policies and responsibilities at the state, federal, and multi-national level. Described transportation patterns include product movement by major railroad system (with contact names and phone numbers), bridge and pipeline crossing locations, as well as transfer, storage, and processing facilities. General climatic information, including ice coverage, for Lake Erie and major rivers, is provided. Vulnerable areas are described by text and maps and include water intakes, beaches and parks, and marinas. Local response resources (including personnel and equipment), laboratory facilities (including address, phone number, and capability), and disposal sites (address and phone number), are listed. A section on "pollution contractor equipment" describes available equipment, waste disposal facilities, and the rates of several private companies.

The plan also summarizes wildlife resources and habitats in charts, including a bio-calendar showing dates and locations of important species. Fisheries resources are provided by tables and charts with spawning date indicated. A list of endangered species is included. Techniques for protecting the endangered bald eagle by hazing are described, and contact phone numbers for locating eagle nests are provided.

The response organization and operational response actions are spelled out in detail. A specific response chart for minor spills is also provided. Cleanup techniques are not specifically discussed; however, the user is referred to a "Response Methods Handbook".

Annexes include a full contact directory, guidelines for disseminating public information, report procedures, and documentation for enforcement and cost recovery (with sample forms). A special 130-page annex entitled "Geographic Action Directory" presents location maps, and shoreline and facility data sheets providing details of the mapped facilities with

access points, pre-determined response protection measures, areas of vulnerability, and relevant agencies with phone numbers. The protection measures are generally booms for containment and recovery. The facility data sheets include intakes, chemical storage areas, pipeline, and response resources.

A total of eight cleanup contractors is referenced in in the contingency plan. These are Alchem-Tran, Associated Chemical and Environmental Services, Environmental Pollution Control Services, Erieway Pollution Control, O.H. Materials (Ohio), Research Oil, Samsel Services, and Valley Systems. All are included in Table 8 and Appendix I-1.

MSO Detroit. The Detroit MSO plan, dated June 1986, contains a description of federal, non-federal, and international policies and responsibilities for the OSC and the entire MSO response structure. Response procedures are described. Among other items, guidelines for spill evaluation and response actions, safety plans for hazardous or toxic substances, and effects of exposure to the cold, are included.

Transportation patterns are described by listings of railroad traffic and bridge and tunnel crossings at the major rivers. Hydrological summaries of flow patterns (tables and charts) in St. Clair River, Lake St. Clair, and the Detroit River, are given. The travel time for spilled substances can then be extrapolated for various seasons. Air trajectory models, useful in toxic chemical spills, are also accessible to the OSC.

A listing of local response equipment (vehicles, boats, radios, booms, sorbents, etc.) is presented. Laboratories, disposal handlers, and other pollution-related contractors with equipment, as well as petroleum and major chemical companies capable of handling spills, are also included. An annex to the plan is devoted to cleanup techniques and policies. Containment, cleanup, removal, and chemical agents, are very briefly discussed with references made to other sources for details. A lengthy checklist is provided to facilitate implementation of the Response Action Plan.

Related to this study, the Detroit plan does not discuss response techniques in terms of equipment use, methods to protect natural resources, dispersant-use guidelines, and cleanup in cold-weather situations. Reference is made, however, to two other manuals for this type of information. These are the Ninth District OPPLAN, Tab A to Appendix 3 to Annex Golf; and the CHRIS Response Methods Handbook, COMTINST M16465.12 Vol. 4 (Old CG 446-4), Appendix 4. It was reported by the MSO that these were on-hand.

A total of five pollution-control contractors was listed in the plan and all are included in Table 8 and Appendix I-1. These are Environmental Management, Great Lakes Environmental Services, Inland Waters Pollution Control, Marine Pollution Control, and O.H. Materials.

MSO Duluth. The plan is from February 1981, with ammendments up to January 1984. An updated plan is in the final stage of review. In the current plan, federal, state, and international policies are explained. Also included are descriptions of highway, railroad, and shipping transport patterns. A list of transfer, storage, and processing facilities is provided in an annex, while a more detailed listing of the facility and its manual of operations is kept on file at the MSO.

It includes resource information by having listings of highly vulnerable areas including recreational beaches, intakes, national forests, and marinas. Endangered species (mammals and birds) are listed by location and habitat. A detailed set of section maps is provided showing the location of access points. Textual descriptions of the maps are very helpful.

The MSO response organization is described and the responsibilities of the various participants and geographic jurisdiction are specified. A contact directory between the USCG and the media is given. Sample forms with explanations are provided for pollution incident reports and documentation.

A very brief mention is made of cleanup methods by mechanical means (pumps, booms, skimmers, etc.) as well as by

manual methods (sorbents). Chemical methods require EPA and OSC approval. A list of approved companies and their chemical agents is provided. A full directory of government and volunteer groups is also given.

An annex to the plan deals with hazardous substances spills and their properties, safety precautions, a spill-response checklist, EPA-designated substances, a cleanup/disposal contractor and local emergency agency directory, reference lists, recommended protective clothing, and a list of selected chemicals normally transported in the area. Endangered species are again described by habitat and distribution. The presence of migratory species is also mentioned.

The plan contains an extremely varied list of service contractors and government agencies. Three contractors are related specifically to cleanup and are included in Table 8 and Appendix I-1. These are Bay West, Lake Head Pipeline, and O.H. Materials.

The following topics, related to this study, were not included in the plan: the circumstances under which cleanup equipment or chemicals are most effective, and response actions to be taken under ice conditions.

MSO Milwaukee. This new plan replaces an earlier, bulkier 1981 plan. Placed in a section available only at MSO Milwaukee (and not able to be evaluated) is a data base consisting of the following: location and data on potential pollution sources; available contractors (cleanup and laboratories); logistical concerns (access sites, equipment, etc.); environmentally sensitive resources; spill action plans; response technical library; and hydrological and climatological factors.

Four sections are presented in the 1986 plan. The first section presents three checklists on oil spills, hazardous substance spills, and fire and explosion in the port. The checklists are quite extensive and all appropriate actions can be expected to have been taken if the list is followed.

The second section contains general information relating to EPA and USCG boundaries, MSO procedures, response team organization, review procedures, and existing agreements of the USCG.

The third section concerns pre-planning for spill incidents. Potential pollution sources are noted on a large number of data forms, filed by geographic location along with coded charts accessible at MSO Milwaukee (part of the data base). Transportation patterns are presented in map format, showing type of transportation systems and transportation patterns by commodity. General information on transportation by vessel, rail, and pipeline is given. Areas of extreme environmental sensitivity are prioritized. Forms to facilitate communication and coordination are included.

The fourth section deals with response information, providing contact phone numbers of federal, state, other response organizations, and waterfront transfer facilities. The function and capabilities of federal, state, and local members of the local response team are listed, as is pre-staged equipment. The contents of the MSO Milwaukee technical library are also listed. Spill action plans for hazardous material for five facilities (available at the MSO) are referenced. Guidance for the disposal of material, requiring WDNR and EPA approval, is presented.

A total of seven cleanup contractors are listed in the plan, of which four are out of business or in other businesses other than related to the provision of cleanup services. The three remaining (Javco, O.H. Materials-Ohio, and Petrolchem), are included in Table 8 and Appendix I-1.

MSO Muskegon. As with all the other MSO plans, this one contains a description of federal, state, and international (Canada-U.S.) policies and responsibilities concerning spill response. Very brief descriptions are also given concerning the transport patterns for oil and hazardous substances along with a information concerning transfer, storage, and processing facilities, and local hydrological and climatological conditions (including effects on the water

table). Highly vulnerable areas are designated including wildlife breeding areas, swamps, marshland and estuarine areas, beaches and shorelines, water intakes, parks, marinas and recreational areas and certain industries. Water intakes, parks, and beaches are shown on section maps. A response directory includes cleanup and disposal contractors and their equipment, laboratories, federal and state agencies, bird-cleaning groups, and volunteer clubs.

Additional material included in the plan includes spill evaluation (with staff functions clearly specified), containment and cleanup methods (with reference to equipment use in another USCG publication), disposal sites (listed), and documentation procedures. Geographic boundaries of responsibility are described and indicated on a map. A separate annex provides cleanup techniques and equipment descriptions suitable for use during the initial response effort. Oil booms are described in terms of boom angle to reduce the net flow velocity under 1.3 knots. Removal techniques are also mentioned (vacuum trucks, sorbents, skimming devices).

Three pollution cleanup contractors are listed in the plan and are included in Table 8 and Appendix I-1. These are Egeler, Marine Pollution Control, and O.H. Materials (Ohio).

Related to this project, the plan does not refer to response actions under ice conditions and is not specific in identifying sensitive natural resources. There is also no discussion concerning the protection of wildlife, birds, or endangered species.

MSO Sault Ste. Marie. This is one of the most comprehensive plans in the region. Topics contained in the plan include policy and responsibilities, planning and response considerations, response organization, operational response actions, coordinating instructions, and procedures for review and update. Annexes are provided and address the following issues: distribution of the plan, pollution response assignments, geographic areas of responsibility, communications procedures, public information, documentation

for enforcement and cost recovery, funding sources, cleanup techniques and policies (with a special annex on extreme cold weather cleanup techniques), arrangements with non-federal groups for technical advice and cleanup responsibilities, agreements for interagency support, and personnel training.

A specific annex to the plan consists of a geographic action directory which provides detailed description of each segment of shoreline and includes boat launching facilities, vulnerable resources, and potential pollution sources for cities and towns in 27 counties. Another annex provides a directory of relevant government agencies; pollution contractors; pipeline, railroad and steamship companies; laboratories, disposal sites, etc. A total of nine pollution-related contractors is listed in the plan; all are included in Table 8 and Appendix I-1. These are Egeler, EnManCo, Great Lakes Environmental Services, Inland Waters Pollution Control, Marine Pollution Control, Norris Contracting, O.H. Materials-Ohio, Site Planning and Development, and Stenberg Brothers.

Also included is a thorough plan for implementation details response actions to be taken following the report of a spill or potential spill.

MSO Toledo. The Toledo plan begins with a statement of responsibilities and jurisdictional boundaries. Transportation patterns are well discussed (no maps). Transfer, storage, and processing facilities; marinas and yacht clubs; beaches, wildlife areas, parks, water intakes and major airports; are all indicated on five section maps (with accompanying data sheets). Hydrological and climatological notes mention the season of ice coverage. Operational response actions are provided as are descriptions of interactions with other agencies (USCG Strike Teams, EPA, U.S. Navy, etc.).

Annexes to the plan deal contain procedures for (1) communications and reports, (2) public information dissemination, (3) documentation and enforcement, (4) cleanup techniques including boom placement angle, chemical

dispersants (to be approved by EPA), and (5) oil disposal. Another annex deals with fish and wildlife protection. Waterfowl protection by hazing (propane cannons, aerial explosives, whistles and noisemakers, high-speed small boats, helium balloons, kites with falcon silhouette, and baiting of other areas, are discussed. For the collection and cleaning of oil-soaked birds, the plan user is referred to the (now out of print) American Petroleum Institute publication called "Saving Oiled Seabirds". An Oil Spill Intelligence Report (4 October 1985) listing of oil spill clean up companies in the U.S., Canada, and Europe, is also reproduced.

A listing of the following is provided for each of the five sections within this MSO region: regional response organizations, cleanup contractors, commercial divers, overflight services, reclamation facilities, disposal sites, accommodations, media, and a cleanup inventory. Firms capable of providing assistance in emergency hazardous chemical spills also listed. The list contains a total of 15 pollution-related contractors. Of these, eight are strictly oriented to providing boat/barge services or are small tank cleaning operations. The remaining seven are more oriented toward spill response or are fairly large construction companies. These are Ace Oil Service, Commercial Oil Service, M. Petty & Sons, Harmeyer Construction, McCullough Construction, L.S. Snyder & Son, and Ken Gill Construction. These are all included in Table 8 and Appendix I-1.

With respect to this project, this plan does not address operations under ice conditions.

STATE AND PRIVATE CONTINGENCY PLANS

Overview

The National Oil and Hazardous Substances Contingency Plan provides that each state will have representatives to the Regional Response Team (RRT) to coordinate activities and to safeguard the interests of the state in which the spill occurs. Most states, including all those within the area of study, also have their own response teams ready to respond to spills inland and in state-owned properties along the shore. However, in most cases, the state will defer to the U.S. Coast Guard (with its financial resources) in responding to a spill within navigable waters. The state is always able to maintain a voice in affairs (e.g., cleanup methods) directly to the OSC or through the RRT. The states for which contingency plans were reviewed as part of this evaluation are listed in Table 6.

In addition to the state plans, one private plan is also evaluated within this same section. Our survey has found very few private contingency plans within the Great Lakes region. However, the brunt of oil spill cleanup has proven to be supervised by the U.S. Coast Guard with the assistance of the states and private spill-cleanup contractors. A discussion contractors in the Great Lakes region is presented in the following section.

Summary

Eight plans were reviewed in total (Table 7). Overall, the plans consistently provide an overview of the response organization in terms of personnel and coordination with other agencies. Equipment availability is also fairly consistent, noting both in-house and commercial available devices. Other aspects of the plans are markedly different. Containment and recovery methods are not mentioned in the Ohio and Illinois plans. The identification of natural resource areas is also highly varied. Helpful diagrams are enclosed in a few of the plans, particularly Pennsylvania. Only the New York plan considers cleanup in ice conditions.

Table 6. Contingency plans of states and private cooperatives bordering the upper Great Lakes. The date of the plan and the telephone and address of a contact person are also presented. Indiana does not have a plan but is included as a reference.

State Plans

Illinois Environmental Emergency Contingency Plan
(Plan date: 1980)
Illinois Environmental Protection Agency
Jim O'Brian, Manager
Contact: Ralph Foster
2200 Churchhill Road
Springfield, Il 62706
(217) 782-3637

Indiana (no plan)
(Plan date: none)
Department of Environmental Management
Emergency Response Branch
Contact: Mr. Skip Powers
105 S. Meridian Street
Indianapolis, IN 46206
(317) 243-5155

Michigan Contingency Plan for Pollutional Spill of Oil and Other Hazardous Materials
(Plan date: 1979+1986 update)
Michigan Department of Natural Resources
State Secondary Complex, General Office Building
P.O. Box 30028
Lansing, MI 48909
Contact: Bill Marks
Chief, Office of Environmental Affairs,
Safety, and Health
(517) 373-7917
(800) 292-4796 Emergency

Minnesota Oil and Hazardous Material Spills Contingency Plan
Plan date: 1980)
Minnesota Pollution Control Agency
Contact: Dick Cable
520 Lafayette Road
St. Paul, MN 55155
(612) 296-7373

New York State
Water Quality Accident Contingency Plan and Handbook
(Plan date: 1977)
Contact: Tom Plesnarski, Chief of Section
Bureau of Spill Prevention and Response
Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233
(518) 457-2462 (Chief)
(518) 457-7362 (Emergency)

Table 6. State and private plans (continued).

Ohio Oil and Hazardous Material Local Contingency Plan
(Plan date: 1982)
Contact: Mike Dalton
Ohio Environmental Protection Agency
Manager, Technical Support Section
Office of Emergency Response
P.O. Box 1049
361 E. Broad Street
Columbus, OH 43266-1049
(614) 466-6542

Pennsylvania
(Plan date: 1984)
Contact: Ken Walizer
Department of Environmental Resources
P. O. 2063
Harrisburg, PA 17120
(717) 787-8184

Wisconsin
(Plan date: 1985)
Contact: Theodore J. Amman
Department of Natural Resources
101 S. Webster Street, Box 7921
Madison, WI 53707
608-266-2857

Private Plans

Petroleum Industry Marine Environmental Co-operative (Ontario) (PIMEC)
(Plan date: 1986)
Contact: C. Baily
Box 2283
2300 Yonge Street
Toronto, Ontario M4P 1E4
(416) 973-1061

Table 7. Summary of state and private contingency plans evaluated within the project terms of reference. Table 6 contains the full name of each plan.

Agency	Equip	Cont.Recov ice/no ice		Mitig	Res	Defl	Dsper	Remov	Dspos
INDIANA	no	no	no	no	no	no	no	no	no
ILLINOIS	YES	no	no	no	YES	no	no	no	YES
MICHIGAN	YES	no	YES	YES	no	YES	YES	YES	YES
MINN.	YES	no	no	no	YES	no	no	YES	YES
NEW YORK	YES	YES	YES	YES	no	YES	YES	YES	no
OHIO	YES	no	no	no	YES	no	YES	YES	YES
PENN.	YES	no	YES	YES	YES	YES	no	YES	YES
WISCON.	YES	no	YES	no	YES	no	YES	YES	YES
PIMEC	YES	YES	YES	YES	YES	YES	YES	YES	YES

Equip = equipment on hand or suppliers.
Cont.Recov = a description of methods to contain or recover spilled material in ice and no ice conditions.
Mitig = techniques to mitigate damage to natural resources.
Res = location of sensitive natural resources.
Defl = methods to deflect oil in swift-flowing currents.
Dsper = dispersant-use guidelines.
Remov = methods to remove oil from sediments, vegetation, and waterfowl.
Dspos = guidelines for disposal or a listing of disposal sites.

Equipment Information. All states indicate the availability of equipment through cleanup contractors. In some cases, limited equipment is available in-house (i.e., Wisconsin has spill-response trailers in several districts). In-house equipment usually consists of laboratory and field supplies, personnel safety equipment, and vehicles. In general, it is clear that much effort has gone into creating directories listing cleanup and disposal contractors and their services.

Containment and Recovery Information. Techniques to contain and recover oil, specifically in ice conditions, are discussed only in the New York plan. The brief reference is to use of a special plywood boom operating in an open-water ditch. General techniques, with no reference to ice, are treated in several plans (Michigan, New York, Pennsylvania, and Wisconsin). The plans from New York and Pennsylvania contain illustrations of the use of dams, booms, skimmers, and hybrid structures, with helpful options. Michigan presents detailed descriptions with illustrations of boom deflection, straw skimming installations under different scenarios, plank skimmers, pipe skimming dams, and others.

Mitigation Information. No plan directly contains methods to mitigate spill-related damage to particular organisms or habitats. Preferred methods of cleanup are not discussed. In the best of cases, the plan offers resource information and a general overview of spill-control techniques. It is implicitly implied that if the proper technique is applied then resource damage would be avoided or lessened. The table-of-contents in the Minnesota plan does list an annex entitled "Cleanup Techniques and Policies"; however, the section is not attached to the plan on-hand. Dispersing agents may be authorized by the OSC in Michigan if large numbers of waterfowl are threatened.

Resource Information. All plans contain resource information. The Minnesota plan lists public water intakes, endangered species (habitat and distribution), and mentions the 950

wildlife refuges administered by the state. It does not present maps. The Ohio plan uses a combination of maps and lists (the state has 370 endangered species). Indiana maps endangered species and Illinois has section maps indicating streams, water supplies, endangered species, and protected areas.

Deflection of Oil. The plans from Michigan, New York, and Pennsylvania have specific reference to deflecting oil in swift-flowing currents. In the Michigan and Pennsylvania plans, illustrations show the application of boom deflectors, straw skimmers, and pipe-skimming dams. The New York plan provides a table of boom angles to reduce the velocity of stream flow to enable the boom to function effectively.

Dispersant-Use Guidelines. Very slight mention to dispersant use is made in the Michigan, New York, and Ohio plans. The use of dispersants is generally discouraged and can only be undertaken with prior approval. For New York, the use of chemical agents is mentioned for the removal of 20 priority hazardous substances, upon approval of the Division of Pure Waters. In Michigan, the OSC may authorize the use of chemical dispersing agents when large numbers of waterfowl are endangered.

Removal Techniques. With respect to oil removal from sediments, vegetation or waterfowl, all the state plans address oil removal to some extent. Covering of oil on sediments by sanding is illustrated by diagrams from Michigan and Pennsylvania. Stream bank collection and cleanup is discussed in the New York plan. A bird cleanup trailer, maintained by U.S. FWS at La Crosse, Wisconsin, is mentioned in the Minnesota plan for bird rescue, rehabilitation, and cleaning.

Disposal Methods or Sites. It is most common for states to list approved sites or haulers. For Cook County, Illinois, hazardous waste site locations are indicated on a map. In Michigan, the disposal of oil and oily waste by reprocessing,

burial, and burning, is discussed. A very detailed list of disposal sites, incinerators, and licensed haulers is also available (see Appendix I-3). Burning in Michigan is only to be carried out under strict constraits concerning weather, air pollution, trained personnel, and fire hazards.

In Minnesota, disposal must be approved by the Emergency Response Unit, often in coordination with the solid waste disposal division of the state's Pollution Control Agency.

In the New York plan, recycling, incineration, and land burial is discussed. A list of companies for land burial (at state approved sites) is in the "Notification Roster".

Review of Individual Plans

Indiana. Although the state does not have an official plan, a document entitled "The Indiana Oil and Hazardous Materials Contingency Plan," in the exact same format as similar documents for lakeside Illinois and Ohio, contains very relevant information for this review. This report contains maps showing highways, pipelines, and railroads, as well as the locations of state parks, forests, and reservoirs, state hatcheries, historic sites, natural preserves, and points of interest. Also included are oil refineries, pipeline companies, and above ground bulk storage facilities. The user of the plan is referred to information sources for historic spills, hydrological and climatological data, vulnerable areas, local response resources, and waterfowl conservation. A list of endangered species, including mammals, birds, mussels, amphibians, fishes, mollusks, crustaceans, and reptiles, is given. An organizational structure for the state's response team is not provided.

Illinois. The Illinois Environmental Protection Agency has the responsibility to provide technical information; monitor and sample; advise on environmental restoration, evacuation, and disposal; technically assist with public water supplies, sewage wastes and waste disposal operations; notify affected users; provide mitigation personnel and equipment; serve as members of the State Damage Survey Team; and document violations.

Responsibilities of other state agencies are specified, and organizational structure is given in Figure 6 describing the functions of the state's Emergency Response Unit. Notification procedures (with phone numbers) and spill classifications are described. A listing of required actions constitutes an "emergency response control guide" and, for reference, a 12-page "emergency control form" is provided. Very detailed instructions are given for field personnel to respond to air and water pollution incidents. A program for land/noise pollution response is also provided and primarily concerns spilled wastes, explosion, fire, flooding, and land or groundwater contamination by oil or hazardous substances.

A directory of processing, recycling, and disposal facilities is given. Another directory includes public water suppliers and their surface water source (by facility and county, but no contact number). Two food processing plants utilizing surface-water sources are also listed. A sample collection guide is presented as are analytical laboratories.

Agencies dealing with pesticides and their roles regarding production, storage and application, are described. A "pesticide incident control sheet" is illustrated. Also presented are emergency response guidelines for coal mining operations describe hazards due to discharges of slurry or process water, and acid water. Control program staff phone numbers are given.

A very detailed inventory of equipment at the Illinois Emergency Response Unit and regional offices is presented. The expiration date of certain chemicals is even listed. The equipment is designed mostly for laboratory and field sampling for air and water quality measurements, not for containment or recovery. A directory of oil and hazardous materials contractors and suppliers lists the equipment they provide. Selected chemical corporations are listed with emergency phone numbers.

An additional plan, entitled "Local Contingency Plan; Region 2, Cook and Lake Counties" provides very specific information on potential sources of oil and hazardous material spills in the lakefront counties. By means of section maps and

Agency Response Functions

The Director, ERU staff, or Duty Officer can declare an environmental emergency incident at which time appropriate staff may activate the EAC and the following functions and personnel assignments shall act as a guide in dealing with an emergency situation.

Function	Personnel	Title
Coordination of Agency Response Situation Assessment Personnel Involved	Supervisor, ERU 1st Alternate Chemist, ERU 2nd Alternate Emergency Response Specialist, ERU 3rd Alternate Division Scientific Advisor	Agency Coordinator
Function	**Personnel**	**Title**
Environmental Assessment Protective Actions	Chemist, ERU 1st Alternate, ERU Staff 2nd Alternate, DLS Lab Manager 3rd Alternate, Division Scientific Advisor	Chemical Analyst
Function	**Personnel**	**Title**
Communications Logistics Notification Parallel Actions	ERU, Duty Officer 1st Alternate, ERU Staff 2nd Alternate, Division Scientific Advisor 3rd Alternate, Division Support Personnel	Duty Officer
Function	**Personnel**	**Title**
Guidance to Response Personnel Division Program Assessment Monitoring and Sampling Recommendations to Chemical Analyst	Predesignated Scientific Advisor from Appropriate Control Division 1st Alternate, Support Personnel 2nd Alternate, Support Personnel 3rd Alternate, Support Personnel	Scientific Advisor
Function	**Personnel**	**Title**
Notify Appropriate Media Field Media Inquiries Prepare Media Release	Predesignated Public Information Officer 1st Alternate, Public Affairs Manager 2nd Alternate, Public Affairs Staff 3rd Alternate, Public Affairs Staff	Public Information Officer
Function	**Personnel**	**Title**
On-Scene Assessment	Regional Response Staff	On-Scene Response Personnel
Function	**Personnel**	**Title**
Discretion of ERU Staff	Meteorologist Industry Representative Private Consultant Media Representative Visitors	Miscellaneous

During Major, Major Large Scale, and Severe hazardous materials incidents, Agency Personnel shall follow the actions outlined in the "Emergency Response Control Guide".

Figure 6. Functions of the relevant Illinois state personnel for responding to emergency incidences.

directories, it contains a compilation of material transport routes (highways, railroads, waterways, and pipelines), waste disposal sites, electric generating stations, as well as resources like streams, water supplies, endangered species and protected areas.

Updated information from October 1986 includes a long list of disposal sites and of nine cleanup contractors, but no mention of the equipment on hand. Of the nine contractors, three are local and related to spill-control on surface waters. These are MAECORP (formerly provided by Environment Mid-America), O.H. Materials, and Petrochem (see Table 8 and Appendix I-1).

With respect to this project, the plan does not discuss containment and recovery methods, environmental resources, nor ice conditions.

Michigan. No currently operational contingency plan has been identified for Michigan. Several reorganizations are reported to have taken place since 1980, the latest of them dating just a few months before the writing of this report. Four divisions handle separately problems regarding hazardous wastes, surface water, ground water, and air quality. Internal policies dictate spill response by each organization on a case by case basis.

A most recent document (August 1986) entitled "Licensed Haulers - Liquid Industrial Waste and Hazardous Waste" has been produced by the Hazardous Waste Division of the Michigan Department of Natural Resources and is contained in entirety in Appendix I-3. This report contains a very comprehensive list of waste haulers and disposal facilities. It is reported that periodic updating is expected.

In spite of the fact that there is no single, overall plan for the state, three previously prepared plans have been identified: (1) the Michigan Hazardous Material Response Plan (1983) prepared by the Michigan Toxic Substances Control Commission, (2) the Wayne County Local Oil and Hazardous Substances Contingency Plan (1981), and (3) the State of Michigan Contingency Plan for Pollutional Spills of Oil and

Other Hazardous Materials (1979?). Enquiries indicate that none of these plans is currently effective, primarily because of institutional reorganizations. A review of the last of these plans is provided below, although it should be understood that a new version is likely to contain substantial changes.

This plan (for Pollutional Spills of Oil and Other Hazardous Materials) is very brief, but contains concise descriptions and illustrations on aspects of notification, containment, cleanup and disposal, restoration, and enforcement. Response organizations, contact names, and phone numbers are provided (see Figure 7). Control procedures and equipment are given in a set of illustrations with helpful captions. An appendix on oil pollution control procedures discusses containment, removal and disposal. The use of booms, dams, and deflection devices is explained. Removal by mechanical devices and absorbent materials is discussed. Sinking agents are generally not allowed. Selective burning can be authorized only by the OSC. Disposal by burial, reprocessing, or incineration may be done after approval.

Another appendix lists the procedures to be followed when taking spill samples for analysis. A third appendix provides excerpts from legal authority concerning water pollution and oil loss. A fourth appendix consists of guidelines for accessing the state's special emergency water cleanup funds. A final section provides rules for the availability of emergency containment structures during on-loading and off-loading of oil and polluting-material storage facilities, as well as the filing of a pollution incident prevention plan.

A list of eight contractors handling state-funded cleanups of hazardous wastes has been provided by the Michigan Department of Natural Resources; three of which are local to the Great Lakes region. These are O.H. Materials, Inland Waters Pollution Control, and Marine Pollution Control, and are included in Table 8 and Appendix I-1.

Although a few references are made to the performance of control measures in cold weather, there is no specific section dealing with ice conditions. Other aspects not dealt with include oil removal from vegetation and waterfowl.

PHASE 1
DISCOVERY AND NOTIFICATION

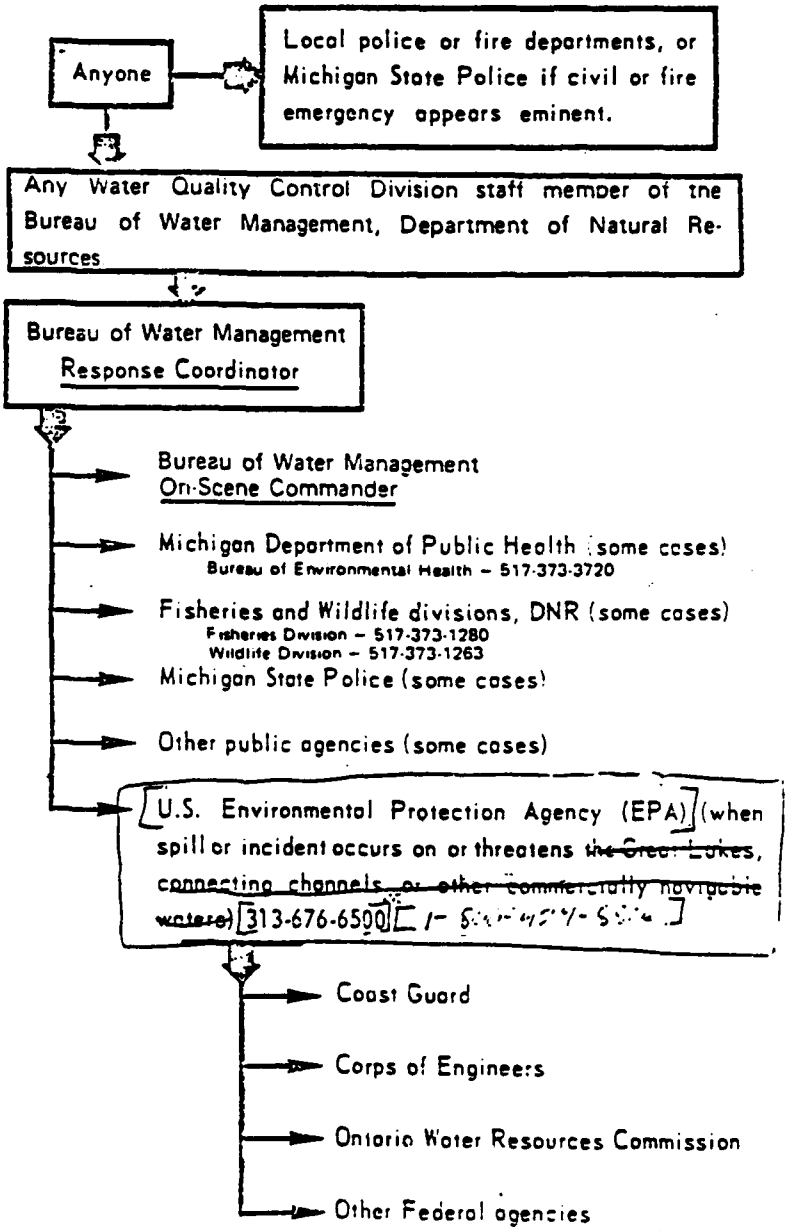


Figure 7. Discovery and notification procedures, State of Michigan.

Minnesota. This plan designates the Minnesota Pollution Control Agency (MPCA) to organize the activities of government agencies involved in a spill incident. It explains the responsibilities of various agencies, as dictated by federal, state, and multi-national policies. A diagram of their response structure is presented in Figure 8. Described in a general fashion are the transportation patterns of oil and hazardous materials; the location of transfer, storage and processing facilities; and historical spill statistics. It is noted that hydrological and climatological considerations render spill control during the winter months difficult to impossible. Highly vulnerable area include water intakes, underground waters, wildlife refuges, parks and recreational area. Public water intakes are listed in Annex XIV, while the others are generally described.

Cleanup contractors and a detailed list of pollution-control equipment are listed (as of 1980) in an annex, but no updated information is available. MPCA resources on-hand are briefly and generally mentioned. Waterfowl cleanup is provided by the Minnesota Department of Natural Resources and the U.S. Fish and Wildlife Service for 22 species of ducks and mergansers, and migrating geese and ducks. An endangered (and proposed endangered) species list is also provided along with a detailed directory of contact personnel. Discussions of icy conditions refer only to difficulties in cleanup and to the number of reduced incidents due to low traffic density.

New York. The state is in the process of revising their contingency plan. As of May 1986, new policies and procedures are being instigated, based on which a new plan will be developed. The organization of the response structure is still in flux. The plan until that time dates from 1977 and defines the responsibilities of New York Department of Environmental Conservation (NYDEC) personnel such as the director, engineer, conservation officer, forester, fish and wildlife supervisor, marine resources director, etc.). It also provides other state as well as federal procedures related to a spill incident. A directory of contact personnel is given. Responsibilities for

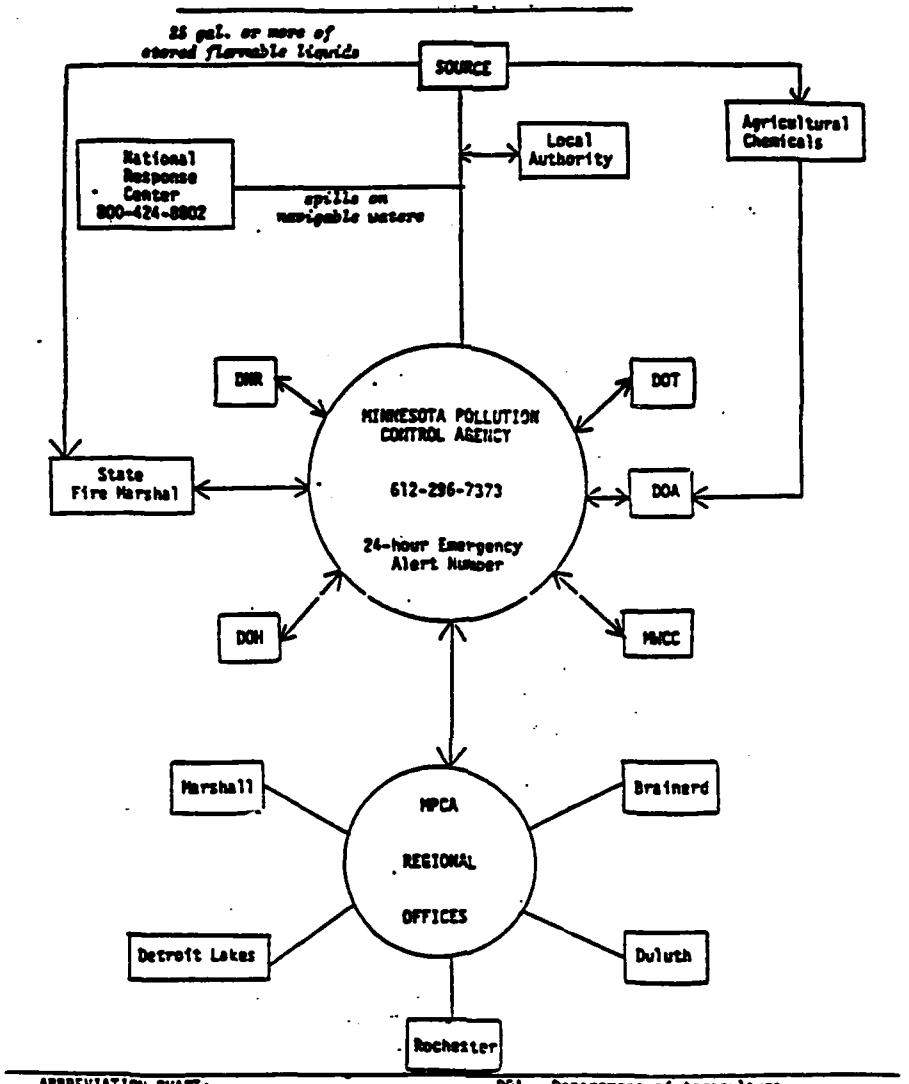


Figure 8. Organizational structure for spill response, State of Minnesota.

specific actions are clearly defined. Methods of spill surveillance are described as to provide the OSC with information.

Several containment techniques are described and illustrated. These include: damming, boom deployment under various conditions, skimmers, and hybrid control methods. A special plywood boom operating in an exposed ditch is described for ice conditions. The use of chemical agents is discouraged; sinking agents are prohibited; burning agents are allowed only under special circumstances; and biological agents are described but only in general terms.

In the plan, twenty hazardous substances are priority-ranked in terms of their threat to water quality. Their removal using chemical agents is described. A listing of hazardous substances and neutralizing procedures is given, although actions can only be taken after consultation with the Division of Pure Waters (Water Resource Monitoring Section).

Pollutant recovery is described using mechanical methods (skimming and slurping) and physical and chemical materials. A mobile hazardous substance spill treatment trailer, capable of removing several classes of hazardous substance from water is described. The trailer can be activated by contacting the U.S. EPA hotline. Cleanup procedures for stream banks is also given. Disposal by recycling, incineration, and land burial are briefly explained. A detailed chapter is provided on investigation techniques, collection of evidence, and legal authority for enforcement. Requirements for "Spill Prevention Control and Countermeasures Plans" are given. A final chapter gives ample technical information regarding dispersion models, characteristics of hazardous substances, pesticides, water quality standards, and surface and ground waters.

A listing of contractors is not provided.

Ohio. This 1982 contingency plan for Ohio contains relevant state, federal, and international statues as well as the responsibilities of the Ohio Environmental Protection Agency. An Emergency Response Center is designated as the focal point for spill incidents. The OSC's responsibilities and basis for

coordination among state agencies are explained. The state's organizational response structure is presented in Figure 9. Priorities for reaction to oil and hazardous material spills are defined. A listing of transfer, storage, and processing facilities, is also presented. It adds that hydrological data can be obtained from the Division of Emergency Response; weather data and short-range forecasts forecasts are available from the National Weather Service (phone numbers listed).

Some highly vulnerable areas (state parks, national parks and forests, and water intakes) are highlighted on section maps, and others (fish hatcheries, exceptional warm-water and cold-water habitats, boating areas, scenic and recreational rivers) are listed.

Local response resources (highway patrol, spill co-operatives, fire departments, health facilities, and pre-qualified contractors) are listed with phone numbers, function, capabilities, and phone numbers.

Contaminated waterfowl can be treated at two bird cleaning stations (addresses and phone numbers given). A list is presented containing over 370 endangered species of mammals, birds, reptiles, amphibians, fish, crustaceans, and mollusks. A map (not in the plan) is apparently available at the Emergency Response Center.

Procedures for the response phase are briefly presented. Guidelines for the use of chemical, dispersing, surface-collecting, biological, burning, and sinking, agents are given.

A directory of six major cleanup contractors is given, as is a longer list of minor contractors, although the latter only contains addresses. In both cases, equipment available from each contractor is not given. The six contractors listed are Ace Oil, AMO Pollution Service, Environmental Pollution Control, O.H. Material, Research Oil, and Samsel Rope and Marine Supply (listed in Table 8 and Appendix I-1). Another list contains drum reclaimers and two PCB incinerators.

An inventory of equipment available at the Emergency Response Center is presented and is well organized by category (i.e., safety, vehicles, containment and cleanup, field testing, and miscellaneous). Equipment available at other

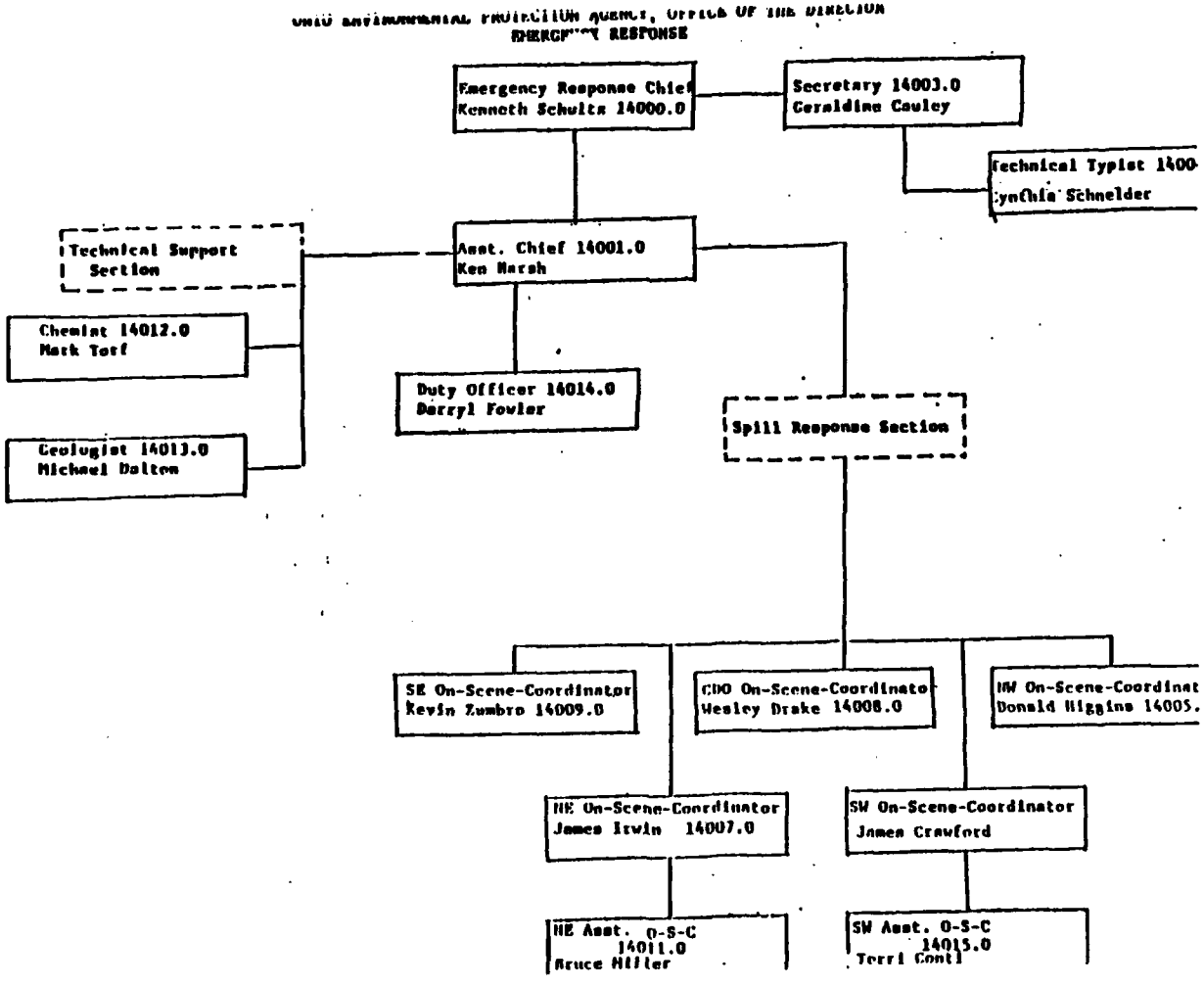


Figure 9. Emergency response structure, State of Ohio.

response agencies is also listed. Titles of books on-hand at the Emergency Response Center are also listed.

An annex to the plan mentions the use of staging area as an important means of protecting downstream areas. No details are provided except that the OSC would select the sites.

This plan does not cover mitigation, recovery, and cleanup techniques. No consideration is given to ice conditions.

Pennsylvania. The Pennsylvania Water Emergency Response Manual, dated 1980, contains directories of agencies involved in emergency spill response including the Bureau of Water Quality Management, Basin Commissions, Fish Commission, and State Police. The rules and regulations for the protection of water resources are included. The state's response structure is presented in Figure 10.

Methods for oil-spill control are briefly described for skimmers, absorbents, dispersants, biological agents, trenches, wells, impoundments, booms, and separators. A set of 12 figures with captions illustrate the use of certain equipment. An article published by the American Petroleum Institute is included to cover ground-water contamination and recovery techniques. Another article reports on a case-history use of recovery wells and a separator system.

A directory of cleanup and waste haulers with available equipment is given in the plan. (Primary local contractors are all listed in Table 8 and Appendix I. These are Ace Oil Service, AMO Pollution Services, CECOS, Jabe Construction and Equipment Company, and O.H. Materials.) Surface and ground water contractors are listed separately in the plan. The emergency response equipment listed only includes miscellaneous field and laboratory supplies. There are additional directories listing solid waste coordinators, regional air quality engineers, and geologists to be contacted for the disposal of absorbent materials. Incinerators and companies for the disposal of PCB's are also listed. The plan contains much other information, not relevant to oil and hazardous substance spills but related to other water-related emergencies.

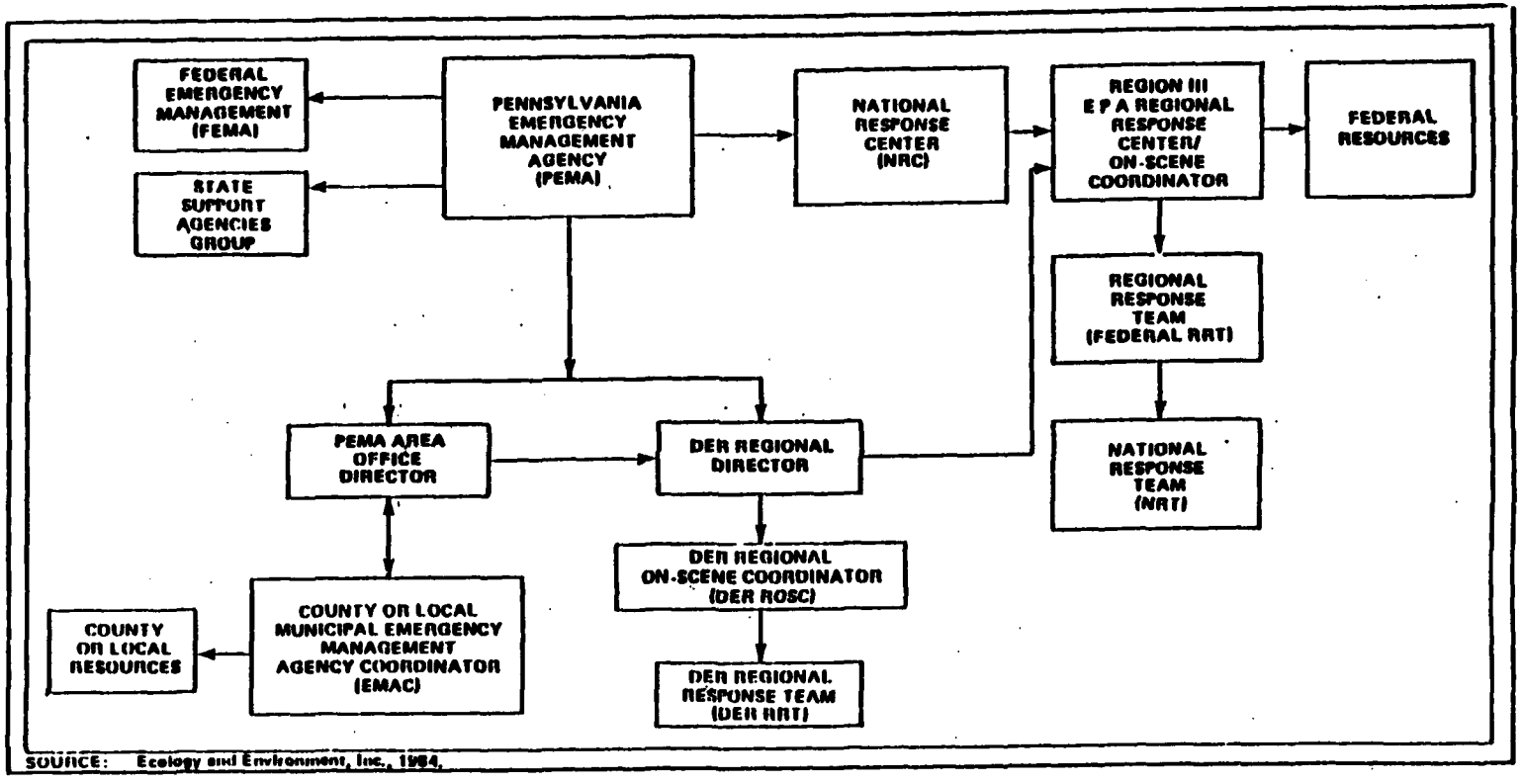


Figure 10. Incident notification system, State of Pennsylvania.

The plan does not discuss sensitive natural resources, dispersants (except cleanup operators who are able to use them), or ice conditions.

Wisconsin. This is a review of the material received from the Hazardous Waste Management Section of the Wisconsin Department of Natural Resources (WDNR) in September 1986. No formal response plan was available.

This four-page summary (August 1986), entitled "Protecting Wisconsin from Hazardous Spills", describes the history, type, and size of spills reported to the WDNR since 1978. State statutes describing the required response to spills are reproduced. The role of WDNR in protecting the environment is undertaken using its own resources or private contractors. Cooperation with other agencies is expected. District Response Teams, under the OSC, include conservation wardens, environmental engineers, biologists, chemists, and other specialists. Each District has a spill trailer equipped with booms, absorbent material, and a pump and hoses, to respond to non-toxic or petroleum spills. Response to toxic-substance spills is handled by specialists hired by WDNR or the spiller. The teams investigate spills, oversee restoration and disposal, select cleanup contractors, and maintain equipment.

Also contained is a partial list of spill-response contractors with addresses and phone numbers, and indication of their response capabilities (divided into the categories of spill response, hazardous waste management, laboratory services, and equipment). One contractor handles PCB disposal. Of the 16 contractors listed, six have been verified as capable of spill response and are incorporated into Table 8 and Appendix I-1. These are A-1 Disposal, Bay West, CECOS, IT Corporation, O.H. Materials, Peoria Disposal, and Petrochem.

Although no reference to a formal plan was made, the material on-hand indicates good organization with in-house and outside personnel having access to cleanup equipment and disposal. No description was offered on natural resources, mitigation techniques, or ice conditions.

PIMEC. The 1986 contingency plan for the PIMEC cooperative, called Blue Water Clean, contains a variety of information oriented specifically toward controlling oil spills within the St. Clair area. Their organizational chart is particularly clear and roles are well-defined. Their equipment list encompasses equipment on-hand, that available through contractors, and from the Canadian Coast Guard. These lists are incorporated into the equipment appendix at the end of this report. Basic information is presented about the distribution of wildlife, and a series of scenarios are described in detail as to methods for protecting the most sensitive areas. One scenario describes a drifting ice situation, but is without specific details as to methods of oil recovery. Deflection of the oil in the strong river currents is also generalized. Disposal sites are listed and presented on a map. A directory of response personnel is contained in the last part of the plan. Guidelines for dispersant use are not included.

EQUIPMENT AND PERSONNEL

Results of the survey to gather information concerning equipment and manpower to respond to oil or hazardous substance spills in an emergency situation are presented in Table 8 and and in Appendix I. Appendix I also contains a directory of 50 companies contacted as part of this study and a listing of over 350 licensed oil and hazardous waste haulers and response companies that were compiled by the State of Michigan on a region-wide basis.

Table 8 contains a summary of each company with respect equipment available. In total, 50 companies including the Canadian Coast Guard are listed. For the most part they are located in Michigan, which is appropriate considering that it has, by far, the longest coastline of the region abutting the four Great Lakes of the study area, and it contains three USCG Marine Safety Offices. Ohio has the next largest contingent of contractors, related to the industrialization found along its coastline. The other states have much less representation on the list, reflecting either a shorter coastline or less industrialization.

Of the 50 companies evaluated in Table 8, 34 have at least one piece of heavy equipment; in this case a bulldozer or front-end loader. In terms of emergency response, it should be remembered that state agencies can also be called on by the spiller or OSC to assist with heavy equipment (as occurred during the Alvenus spill in Texas, 1984). Thirty-six of these contractors have vacuum trucks, considered a fairly standard item in the business, as are tank trucks.

With reference to oil-spill equipment, 28 contractors have both sorbents and pumps, and 31 have booms. Skimmers were somewhat less common (21 contractors or 42 percent). Most companies did not have dispersants on hand, although 11 of the 50 did (which is surprising considering the limited possibility of obtaining permission to use dispersants in the Great Lakes).

Personnel able to respond to spills were available from all except eight of the 50 companies. Table 8 divides contractor personnel into supervisors and field-hands. These personnel serves as a core of spill-response personnel,

Table 8. Summary of equipment and personnel for 50 contractors who responded to our request for information. Their full title and contact telephone and address are presented in Appendix I-1.

	CONTRACTOR	ST	BU	GR	FR	TR	VA	TA	BO	PU	SO	SK	DI	PE	BT	CH
*	A & B	MI	X		X	X	X	X	X	X	X			4,26	X	X
*	ACE	OH	X		X	X	X		X	X	X			6,29	X	
*	ALCHEM	OH	X		X	X	X	X	X	X	X	X	X	20,30	X	X
	AMOCO	MI							X	X		X		2, 0		
*	AMO PO	PA			X	X	X	X	X	X	X	X	X	3,19	X	
	A-1	MI					X	X						3,22		
*	ASCHEM	OH	X	X	X	X	X	X	X	X	X	X		8,32	X	X
	BAY DE	MI							X	X	X	X				
*	BAY WE	MN				X	X		X	X		X		7,18	X	X
*	CCG (CAN)					X	X	X	X	X	X	X		N.A.	X	X
*	C & K	OH				X	X	X		X				3,20		
*	CECOS	OH	X		X	X	X	X	X	X	X			5,10	X	X
*	COMM	OH				X	X	X	X		X			N.A.		
*	EGELER	MI				X	X	X	X	X	X	X		9,40	X	
*	ENMANC	MI	X		X	X	X	X	X	X	X			2, 7	X	X
*	EN CON	MI			X	X	X	X	X	X	X			6,29		
	EN MAN	OH	X	X	X	X	X	X	X	X	X	X	X	9,39	X	X
*	EN POL	MI	X	X		X	X			X	X			8,32		X
	ERIEWA	OH				X	X	X						3, 7		
*	EVER C	MI				X		X						5, 4		
	GREAT	MI			X	X	X	X	X	X	X			12,3[illegible]	X	
*	HARM	OH	X				X			X				N.A.		
	INLAND	MI	X	X	X	X	X	X	X	X	X			15,135	X	X
*	IT COR	WI								X	X	X	X	8,20		X
*	JABE C	PA	X	X	X	X		X		X	X			2, 7		

* Descriptions of services provided Appendix I-1.

ST	State	PU	Pumps
BU	Bulldozers	SO	Sorbents
GR	Graders	SK	Skimmers
FR	Front-end loaders	DI	Dispersants
TR	Trucks	PE	Personnel (Supervisors, Field)
VA	Vacuum-trucks	BT	Boats
TA	Tank trucks	CH	Chemical Analyses
BO	Booms	N.A.	Not Available

Table 8. Spill Contractors (cont.).

	CONTRACTOR	ST	BU	GR	FR	TR	VA	TA	BO	PU	SO	SK	DI	PE	BT	CH
	JAVCO	WI				X	X	X	X	X	X		X	2, 3	X	X
*	KEN GI	OH	X	X	X	X				X				1, 7	X	
*	LAKEHE	MI	X					X	X	X				1, 8		
*	L.S.SY	OH	X	X	X	X								N.A.		
	MAECOR	IL	X	X	X				X	X	X	X	X	6,80	X	X
*	MARINE	MI			X	X	X	X	X	X	X	X	X	5,25	X	
*	MCCULL	OH	X	X		X				X				N.A.	X	
*	M.PETT	OH	X		X	X	X	X	X	X	X	X		6,20	X	
*	MORAVY	MI	X	X	X	X	X	X	X	X		X		2, 9	X	
*	NATION	IN	X			X	X	X	X	X	X	X		N.A.	X	
	NORRIS	MI	X	X	X	X				X				N.A.		
	OHM1	MN	X	X	X	X	X	X	X	X	X	X	X	6,20	X	X
*	OHM2	OH	X		X	X	X	X	X	X	X	X	X	40,400	X	X
	PENIN	MI				X	X							0, 4		
*	PEORIA	IL	X	X	X	X	X	X	X	X	X			3, 3	X	X
*	PETRO	IL	X		X	X	X	X	X	X		X	X	N.A.		
	RESEAR	OH				X	X	X		X	X		X	4,21		X
*	SAMSEL	OH			X	X	X	X	X	X	X	X		6,12	X	X
*	SITE P	MI	X		X	X				X				0, 9		
	SPILL	IN			X		X	X	X	X	X	X		2,11	X	X
*	STENBE	MI	X		X	X	X	X		X		X		6, 8	X	
*	STONY	OH					X							1, 2		
	USX1	MI	X							X				10,100		
	USX2	MI							X		X			3, 4		
*	VALLEY	OH				X	X	X		X				N.A.		

* Descriptions of services provided Appendix I-1.

ST	State	PU	Pumps
BU	Bulldozers	SO	Sorbents
GR	Graders	SK	Skimmers
FR	Front-end loaders	DI	Dispersants
TR	Trucks	PF	Personnel (Supervisors, Field)
VA	Vacuum-trucks	BT	Boats
TA	Tank trucks	CH	Chemical Analyses
BO	Booms	N.A.	Not Available

essentially able to fulfill the ongoing pollution-contracting needs of the region. Many of the firms are construction-related, and during a spill situation could switch personnel over to assist the response effort. Based on telephone interviews with almost all contractors, they feel that they could vastly increase their field personnel through outside hiring if the spill situation warranted it. However, difficulties increase severely if it was a hazardous substance spill.

Boats, for the most part, consisted of two size classes: a 10-ft skiff for small streams, and an 18-ft work boat suitable for nearshore response. Several companies did, however, have inboard boats 40-ft or larger available.

Chemical analyses could be performed at 19 of the 50 companies queried, although none specialize in this aspect of response. Most offer these analyses as part of their full-service capability of responding to oil or hazardous substance spills.

It should be noted that this list, as well as the directory of Appendix I, contains several companies which do response as a sideline to their other activities (e.g., tank cleaning, sewer cleaning, construction, etc.). Of the 50 listed in Table 8, 29 could be considered full-service response companies. All companies are available on a contract basis. The U.S. Coast Guard 9th District has no response equipment of their own (excluding boats, of course) except under unusual emergency situations when the USCG Strike Team could be called in.

CONCLUSIONS

A total of 50 federal, international, state, and private contingency plans was reviewed and evaluated as part of this project (see summary Table 9). These plans provide the operating procedures for the primary agencies responding to oil and hazardous substance spills within the upper Great Lakes region. In addition, a summary of equipment and personnel available for response in this region was prepared based on information collected from 49 private companies as well as the Canadian Coast Guard.

A total of 13 plans presents information concerning techniques to contain and recover oil in non-ice conditions. Representative diagrams from these plans are presented in Appendix D. In contrast, only four plans make any notations toward ice conditions. Most provide only a curt description of seasonal ice coverage. The exception to this is the plan developed by the Sault Ste. Marie Marine Safety Office which describes basics concerning oil recovery, storage, and disposal in ice conditions (duplicated in Appendix H).

Plans specifically to mitigate environmental damage are essentially nonexistent (except for the few representative techniques included in Appendix E); however, each plan does infer mitigation in that if the plan is followed, and the appropriate equipment is utilized, then environmental damage will be lessened. Several plans go further by providing specific oil recovery sites (which if utilized would, likewise, decrease damage). Environmental sensitivity maps, prepared as annexes to the CANUSLAK supplements, and mentioned also in USCG MSO plans, present brief summaries of preferred cleanup methods for oiled shorelines; however, these maps with text are not officially part of the CANUSLAK supplements. Most contingency plans in the region provide at least basic information concerning the resources needing protection. Nine plans also reference bird cleaning and hazing (see Appendix G) as a method of mitigating damage to wildlife.

Methods to deflect oil in swift-flowing rivers are presented in ten plans (see the illustrative diagrams from the

Table 9. Summary evaluation of all contingency plans.

Agency	Equip	Cont.Recovice/no ice		Mitig	Res	Defl	Dsper	Remov	Dspos
Federal:									
CG -9TH	no	no	no	no	no	no	no	no	no
EPA -II	no	no	no	no	no	no	no	no	YES
EPA -V	no	no	no	YES	no	no	YES	no	no
FWS -3	YES	no	no	no	YES	no	no	YES	no
FWS -5	YES	no	no	no	YES	no	no	YES	no
NOAA -US	no	no	no	no	no	no	YES	no	no
NPS -US	no	no	YE	YES	no	YES	YES	YES	YES
CAN-US	no	no	no	no	no	no	no	no	no
CANUSLAK	no	no	no	no	no	no	no	no	no
ST.CLAIR	no	no	YES	YES	YES	YES	YES	YES	YES
ST.MARYS	no	no	YES	YES	YES	YES	YES	YES	no
MSO's:									
BUFFALO	YES	no	no	YES	YES	YES	no	YES	YES
CLEVELAND	YES	no	no	YES	YES	YES	no	no	YES
CHICAGO*	YES	no	no	no	no	no	no	no	YES
DETROIT	YES	YES	YES	YES	no	no	no	no	YES
DULUTH	YES	no	no	YES	YES	no	no	no	YES
MILWAUKEE	YES	no	YES	YES	YES	**	no	**	YES
MUSKEGON	YES	no	YES	YES	YES	YES	YES	no	YES
STE.MARIE	YES	YES	YES	no	YES	YES	YES	YES	YES
TOLEDO	YES	no	YES	no	YES	no	no	YES	YES
State and Private:									
INDIANA	no	no	no	no	no	no	no	no	no
ILLINOIS	YES	no	no	no	YES	no	no	no	YES
MICHIGAN	YES	no	YES	YES	no	YES	YES	YES	YES
MINN.	YES	no	no	no	YES	no	no	YES	YES
NEW YORK	YES	YES	YES	YES	no	YES	YES	YES	no
OHIO	YES	no	no	no	YES	no	YES	YES	YES
PENN.	YES	no	YES	YES	YES	YES	no	YES	YES
WISCON.	YES	no	YES	no	YES	no	YES	YES	YES
PIMEC	YES	YES	YES	YES	YES	YES	YES	YES	YES

Equip = equipment on hand or suppliers.
Cont.Recov = a description of methods to contain or recover spilled material in ice and no ice conditions.
Mitig = techniques to mitigate damage to natural resources.
Res = location of sensitive natural resources.
Defl = methods to deflect oil in swift-flowing currents.
Dsper = dispersant-use guidelines.
Remov = methods to remove oil from sediments, vegetation, and waterfowl.
Dspos = guidelines for disposal or a listing of disposal sites.

FWS plan in Appendix F). A few plans also present a series of tables relating current velocity to boom angle to decrease the net flow past the boom to less than 1.3 knots (to avoid oil passage under the boom).

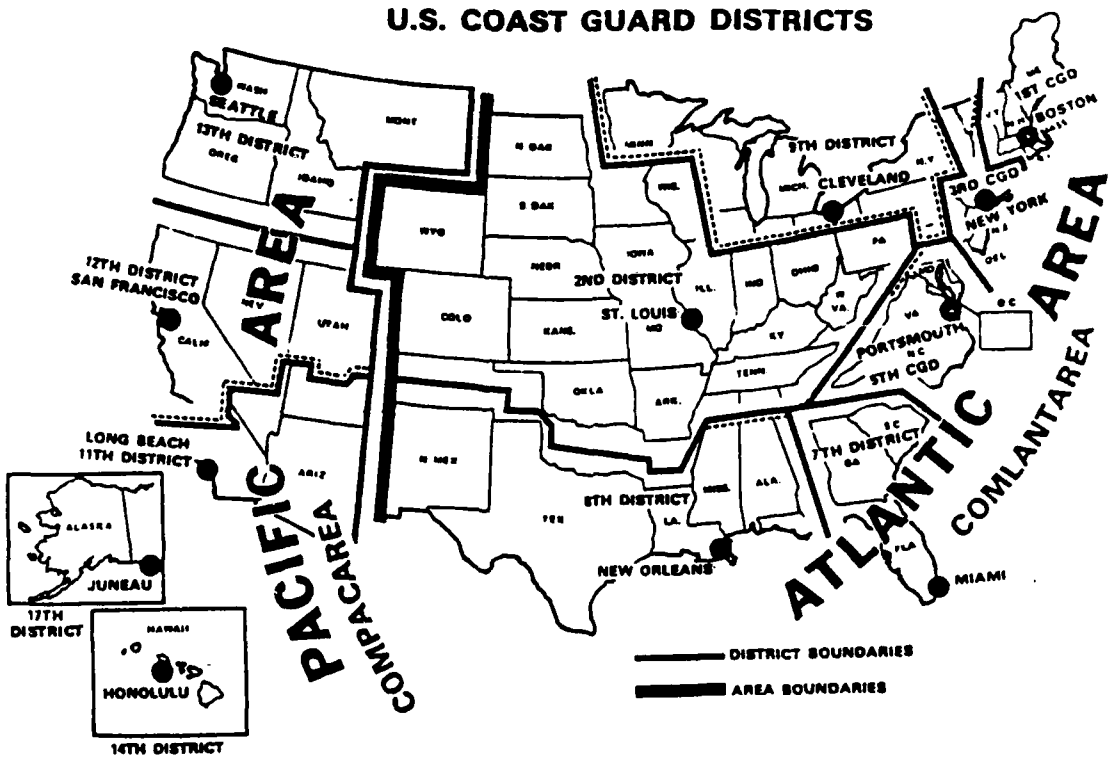
Disposal methods are, at best, summarized by type in the plans; for example, incineration, land burial, biodegradation, etc. Plans for a specific spill scenario are generally lacking. Licensed disposal sites are, however, commonly listed. It is assumed that if these sites are contacted, then the material will be disposed of properly. Other guidelines are not generally presented.

In all (with the exception of the Sault Ste. Marie MSO plan), there appears to be a serious lack of information presented in these contingency plans concerning the collection and disposal of oil in ice conditions. Information developed in Alaska and Canada are noticeably absent. This includes various burning methods (using incendiary devices for in-situ burning and different types of portable incinerators), use of fire-proof boom, use of Archimedian screw and hovercraft vehicles to collect oil, and the most efficient methods to contain and collect oil in ice conditions (e.g., using open leads in the ice, sorbents, rope mops, manual snow removal, etc.). The general impression gained by reviewing these plans is that oil in ice is currently not considered a problem within the Great Lakes region.

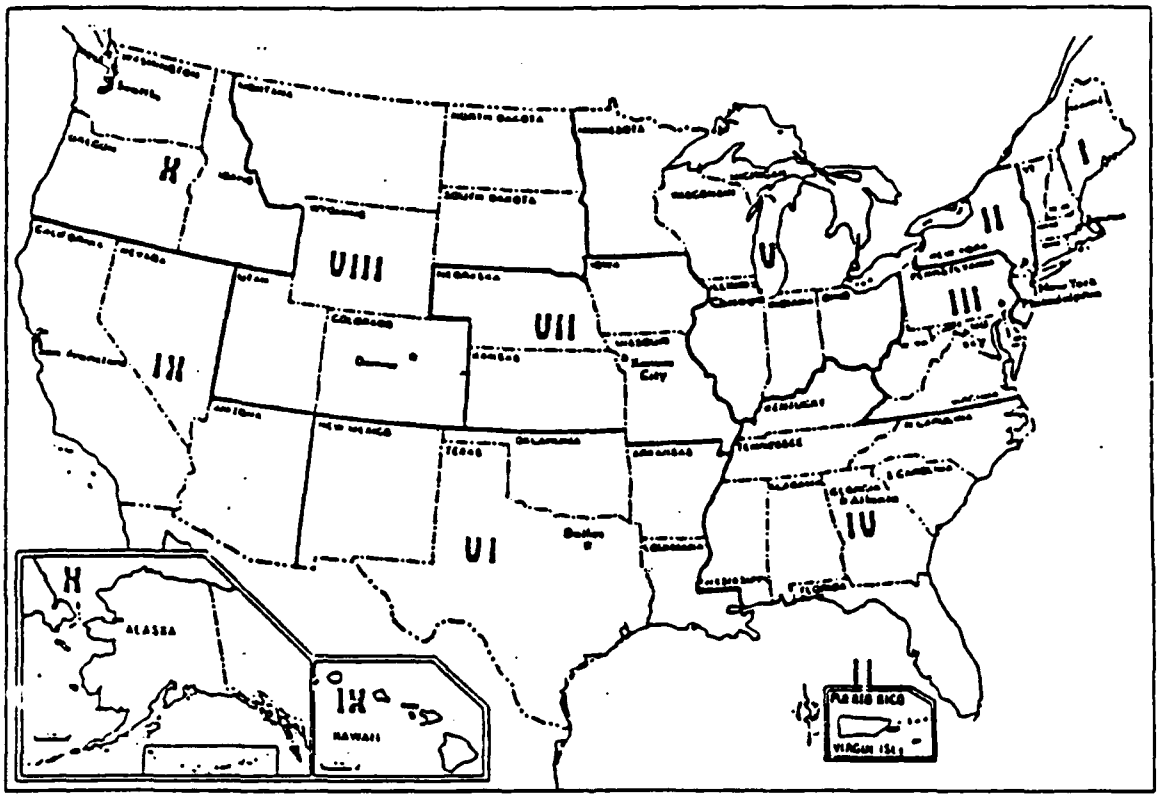
APPENDIX A

MAPS OF FEDERAL DISTRICTS

1. U.S. COAST GUARD DISTRICTS
2. USCG MARINE SAFETY OFFICES AND CANADIAN CG DISTRICTS
3. U.S. EPA DISTRICTS
4. CANADIAN COAST GUARD BOUNDARIES AND EQUIPMENT DEPOTS

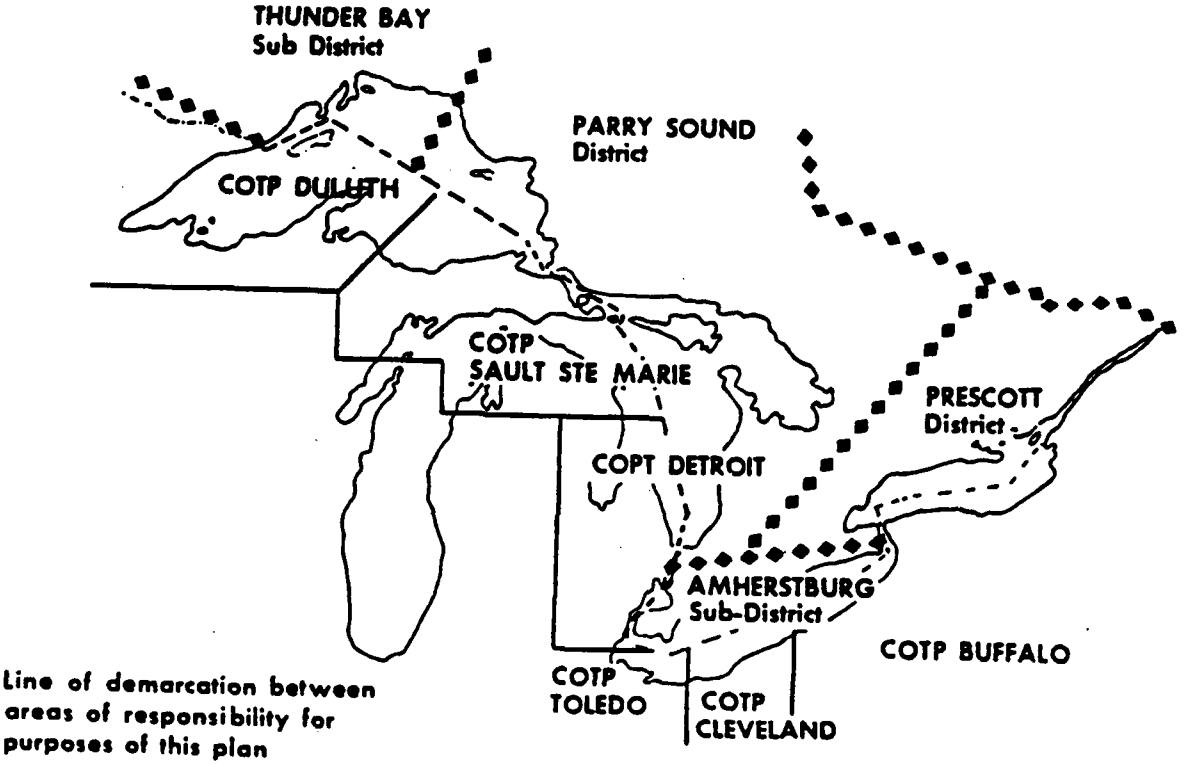


(from USCG Great Lakes Coastal Region Oil and Hazardous Substances Contingency Plan, 1985)



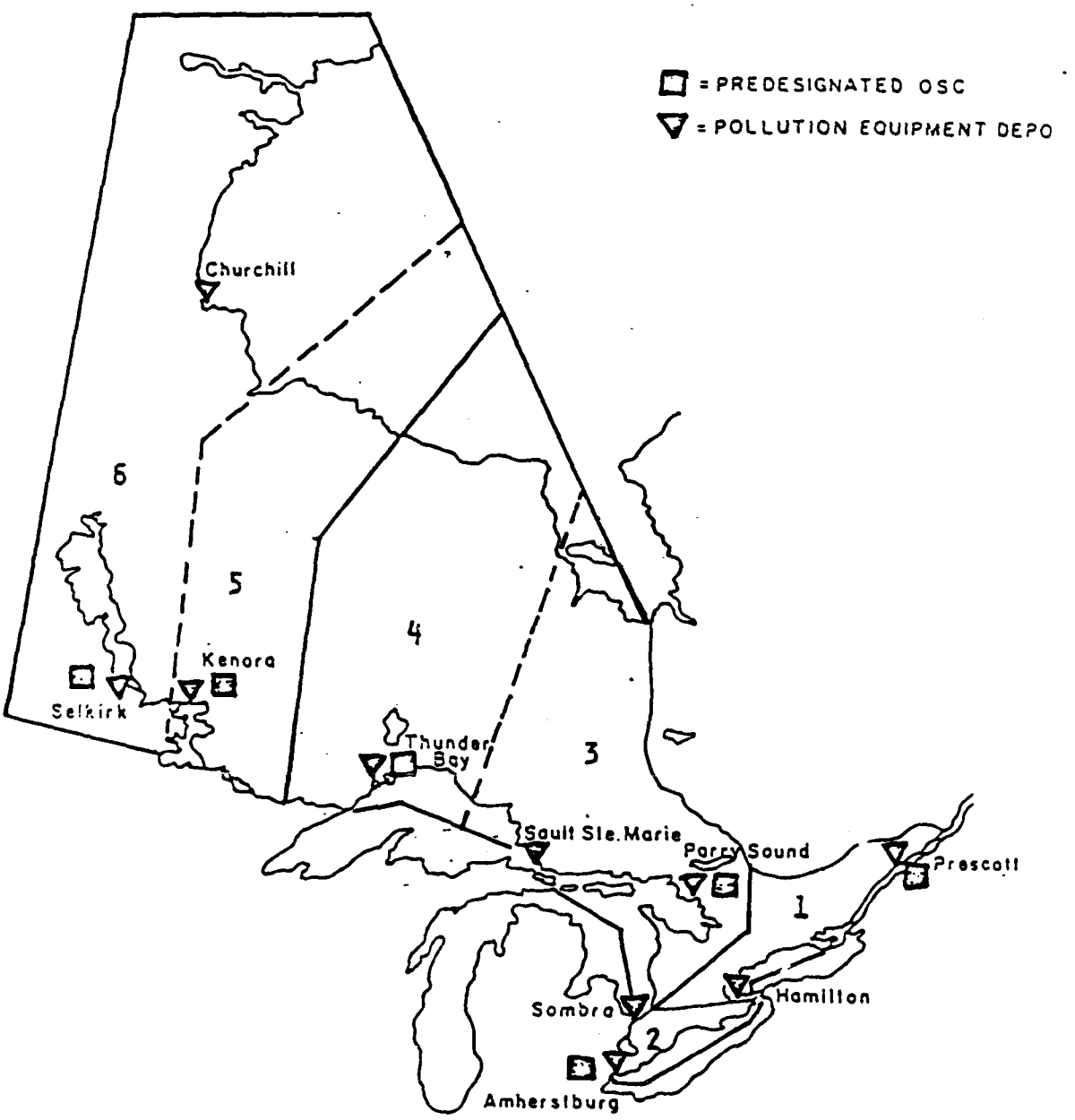
U.S. EPA DISTRICTS

(from USCG Great Lakes Coastal Region Oil and Hazardous Substances Contingency Plan, 1985)



USCG MARINE SAFETY OFFICES AND CANADIAN
COAST GUARD DISTRICTS

CANADIAN CENTRAL REGION OSC ZONE BOUNDARIES



(from USCG Great Lakes Coastal Region Oil and Hazardous Substances Contingency Plan, 1985)

APPENDIX B

RESPONSILITIES OF THE U.S. SPILL-RESPONSE TEAM UNDER THE NATIONAL CONTINGENCY PLAN

(from EPA Regional Contingency Plan, Region 5, 1986)

302 National Response Team

302.1 The NRT consists of representatives from the primary and advisory agencies. It serves as the national body for planning and preparedness actions prior to a pollution release and for coordination and advice during a pollution emergency. It shall be organized and shall function as outlined in Subpart C of the National Plan.

302.2 The NRT shall consider revisions to the National Contingency Plan.

302.3 Based on continuing evaluation of response actions the NRT shall consider and make recommendations to appropriate agencies relating to training and equipping response team personnel; necessary research, development, demonstration and evaluation, stockpiling; and other operational matters as the need arises.

302.4 During oil or hazardous materials incident responses, the NRT shall act as an emergency response team to be activated in the event of a release involving oil or hazardous materials which (1) exceeds the response capability of the region in which it occurs, (2) transects regional boundaries, or (3) involves significant numbers of persons or nationally significant amounts of property. The NRT can also be called out, upon request, by any primary agency representative. Each representative, or an appropriate alternate, shall be notified by telephone of activation of the NRT. The NCP gives NRT authority to recommend response actions to the OSC through the RRT.

303 National Response Center

303.1 The NRC, located at Headquarters, USCG, is the Washington, D.C., headquarter's site for activities relative to oil or hazardous materials release emergencies. NRC Headquarters, described in subpart C of the National Plan, provides communications, including a continuously-manned communcation center, information storage, and necessary personnel and facilities to promote the smooth and adequate functioning of this activity. The NRC maintains the basic national reporting service for notifications and relays these reports to appropriate states and EPA and USCG district or regional offices.

304 Regional Response Team

304.1 The RRT serves as the regional body for planning and preparedness actions before an oil or hazardous materials release. The RRT consists of regional representatives of the participating agencies and state and local government representatives, as appropriate. The full participation of high-level representation from state and local governments with major ports and waterways is desired.

304.2 The representatives of EPA and USCG shall act as chairman of the Inland RRT and Coastal RRT, respectively.

304.3 Each participating federal agency shall designate one member and a minimum of one alternate member to the RRT. Participating state and local municipalities should also designate one member and a minimum of one alternate member to the team. Agencies may also provide additional representatives as observers to meetings of the RRT. Persons representing the participating agencies may vary depending on the subregional area in which the release occurred or on whether removal actions are underway. Details of such representation are specified in the Regional Response Team Directory and briefly in Annex II of the Regional Plan.

304.4 RRT members shall designate representatives of their agencies to work with OSCs to develop local plans, to plan for the use of agency resources located within the OSC's area of responsibility, and to respond to oil and hazardous materials incidents.

304.5 Each of the states within EPA-Region V is encouraged to participate actively in all RRT activities and to designate representatives to work with the OSCs to develop regional and local plans and to plan use of the state resources located within the OSC's area of responsibility. When the RRT is activated for an oil or hazardous materials emergency, the affected state or states are invited to participate in all RRT deliberations. Any state or local government that participates in the RRT has the same status as any federal member of the RRT.

304.6 The Chairman of the RRT shall ensure that the provisions of this Plan are adequate to provide the OSC with appropriate technical and professional assistance from participating agencies commensurate with the agencies' resources, capabilities and responsibilities within the region. During an oil or hazardous materials emergency, the members of the RRT shall ensure that the resources of their respective agencies are made available to the OSC.

304.7 When not activated for an oil or hazardous materials release response, the RRT serves as a standing committee to recommend needed policy changes in the regional response organization, to revise the regional plan as needed, and to evaluate the preparedness of the agencies and effectiveness of local plans for coping with oil or hazardous materials releases. The RRT shall:

(1) Conduct advance planning for use of dispersants, surface collection agents, burning agents, biological additives, or other chemical agents in accordance with 300.84(e) of the National Contingency Plan.

(2) Make continuing review of regional and local responses to discharges or releases, considering available legal remedies, equipment readiness and coordination among responsible public agencies and private organizations.

(3) Based on observations of response operations, recommend revisions of the National Contingency Plan to the NRT.

(4) Consider and recommend necessary changes based on continuing review of response actions in the region.

(5) Review OSC actions to help ensure that Federal regional and Federal local contingency plans are developed satisfactorily.

(6) Be prepared to respond to major discharges or releases outside the region.

(7) Meet at least semi-annually to review response actions carried out during the preceding period, and consider changes in Federal regional and Federal local contingency plans.

(8) Provide letter reports on their activities to the NRT twice a year, no later than January 31 and July 31. At a minimum, reports should summarize recent activities, organizational changes, operational concerns, and efforts to improve State and local coordination.

(9) Encourage the State and local response community to improve their preparedness for response.

(10) Conduct training exercises as necessary to ensure preparedness of the response community within the region.

304.8 The RRT shall act as an emergency response team to be activated in the event of a release involving oil or hazardous materials which (1) meets the definition of a Major Release [105.16 (3)]; (2) exceeds the response capability available to the OSC within the locale in which it occurs; (3) transects regional boundaries; (4) involves significant numbers of persons or regionally significant amounts of property; or (5) when requested by any representative to the RRT.

304.9 The RRT shall be notified by the EPA duty officer automatically in the event of a major or potential major release. The RRT may be activated during any other emergency by an oral request from any RRT representative to the chairman of the team. Each representative, or an appropriate alternate, shall be notified immediately by telephone of activation of the RRT. Requests for team activation, shall be confirmed in writing. The time of team activation, method of activation (e.g., telephone notification or assembly), place of assembly (if appropriate), and means of contact shall be included in POLREPS submitted in accordance with part 304.10 (5).

304.10 When activated during an oil or hazardous materials release response, agency representatives shall meet at the call of the chairman, which can be requested by any member of the RRT, and may:

(1) Monitor and evaluate reports from the OSC ensuring their completeness. The RRT shall advise the OSC on duration and extent of the federal response and may recommend specific courses of action in combating the release for consideration by the OSC.

(2) Request other federal, state, local government, or private agencies to consider taking action under their existing authorities to provide the resources necessary for combating a release or deployment of personnel to monitor response operations.

(3) Help the OSC in preparing public information releases and in transferring information between the OSC and the Washington, D.C., Headquarters of the agencies concerned so as to minimize or prevent dissemination of spurious and incomplete information. Public information actions are discussed in Annex VI.

(4) Advise the regional head of the agency providing the OSC if a shift of on-scene coordination from the predesignated OSC to another OSC is indicated by the circumstances or progress of an oil or hazardous material release.

(5) Submit POLREPS (Pollution Reports) to the NRC in a timely manner as developments occur and not later than 1600 local time on each day of the operation.

304.11 If any member of the RRT dissents from a decision of the RRT on a discretionary action pursuant to the plan, or an interpretation of the plan, that member may appeal that decision to the NRT. The dissenting member shall notify the Chairman of the RRT of its appeal

304.12 Deactivation of the RRT shall be by agreement between EPA and participating team members. The time of deactivation shall be included in POLREPS.

304.13 Boundaries of the standard federal regions shall be followed for development of the Regional Contingency Plan. Boundaries for local contingency plans shall coincide with those agreed upon between EPA and the USCG in determining OSC areas of responsibility (see Annex IV of this Plan).

305 Regional Response Center

305.1 For oil or hazardous materials control activities under this Plan, the Regional Response Center is accommodated at the Environmental Protection Agency Region V office in Chicago, Illinois. The Regional Response Center is accommodated in quarters described in Annex III of this Plan and provides communications, information storage and other necessary personnel and facilities to promote the proper functioning and administration of this Plan.

306 On-Scene Coordinator

306.1 The OSC shall coordinate and direct federal oil or hazardous materials control efforts at the scene of a release or potential release of oil or hazardous materials described in the NCP section 300.33. EPA-Region V OSCs have been predesignated in section 301.2 of this Plan, except that DOD shall designate OSCs responsible for taking all actions resulting from releases of hazardous substances from DOD facilities and vessels.

(1) In the event of a release of oil or hazardous materials, the first official on the site from an agency having responsibility under this Plan shall assume coordination of activities under this Plan until the arrival of the predesignated OSC. This official may initiate Federal funding as authorized by the OSC or any other authorized representative of the lead agency.

(2) The OSC shall determine facts about a release, such as its potential impact on human health and welfare; the nature, amount, and location of material released; the probable direction and time of travel of the material; the resources and installations which may be affected, and the priorities for protecting them.

(3) The OSC shall initiate and direct, as required, Phase II, Phase III, and Phase IV operations, as described in Subparts E & F of the NCP, and consistent with other responsibilities shall coordinate with agency representatives on-scene who are carrying out their agency responsibilities. OSCs may designate persons from Federal, state or local agencies to act as their on-scene representative. State and local representatives, however, are not authorized to take actions involving expenditure of funds.

Advice provided by DOI through the U.S. Fish and Wildlife Service or by DOC through the National Marine Fisheries Service on the cleanup of releases that affect or have the potential of affecting endangered species, shall be binding on the OSC unless, in the judgment of the OSC, other actions are required to prevent or substantially reduce hazard to human life or substantially reduce explosion or fire hazard to property.

(4) The OSC shall call upon and direct the deployment of needed resources in accordance with this Plan to evaluate the magnitude of the release and to initiate and continue removal operations.

(5) The OSC shall provide necessary support and documentation for Phase V activities.

(6) In carrying out this Plan, the OSC will fully inform and coordinate closely with the RRT to ensure the maximum effectiveness of the federal effort in protecting the natural resources and the environment from oil or hazardous materials damage.

(7) The OSC is responsible for addressing worker health and safety concerns at a response scene, in accordance with section 300.38 of the national plan.

306.2 EPA and the USCG shall ensure that OSCs are predesignated for all areas within the region.

(1) The EPA is responsible for furnishing or providing On-Scene Coordinators for the inland waters in Region V. A more detailed description of the OSC areas of responsibility is included in Annex IV.

(2) The USCG COTP shall serve as pre-designated OSC under this plan in the following circumstances:

(a) The USCG Ninth District is assigned the responsibility to provide OSCs for the open waters of the Great Lakes including Lake St. Clair, the interconnecting rivers, major bays, ports and harbors. As this is the coastal regional area of Region V, a more detailed description of the area of responsibility is included in Annex IV Section 1409.

(b) The U.S. Coast Guard Second District is assigned the responsibility to provide OSCs for several rivers and river port areas according to agreements reached with EPA Region V.

(See Annex IV, Sec. 1408, on Second Coast Guard District OSC Boundaries.) River areas not covered in Section 1408 fall under EPA authority relative to OSCs but Coast Guard assistance can be requested if its personnel and equipment are available.

(c) Certain significant marine/maritime incidents on commercially navigable waters within Region V which involve Coast Guard regulated waterfront facilities, Coast Guard inspected vessels, or that impact on port safety responsibilities or vessel inspection activities of the Coast Guard under the Ports and Waterways Safety Act, and Federal Vessel Inspection Statutes. All such incidents shall be rapidly evaluated by the Coast Guard Captain of the Port for a determination of whether the incident falls within this section.

(3) The major consideration in selection of the OSC shall be based upon that agency's capability and resources for oil and hazardous materials release control response activities and the individual OSC's knowledge of the National Contingency Plan and the appropriate Regional Contingency Plan.

306.3 All federal agencies are required by executive order to develop emergency plans and procedures for dealing with accidental oil or hazardous materials releases. All federal agencies are, therefore, responsible for designating the offices to coordinate response actions for facilities or vessels under their jurisdiction and for the provision of means to remove or mitigate the effects of releases from their facilities. If the responsible agency does not act promptly or take appropriate action, the EPA or USCG shall, depending on the area in which the release occurs, assume the OSC functions. Oil or hazardous materials release control actions taken must be in accordance with federal regulations and guidelines and this Plan.

306.4 The OSC is responsible for developing and maintaining a local contingency plan for the OSC's area.

307 Special Forces

307.1 The National Strike Force (NSF) shall be established consisting of personnel trained, prepared and available to provide necessary services to carry out this Plan. This NSF shall be formed around the Strike Teams established by the U.S. Coast Guard on the east, west, and gulf coasts, and including the Environmental Response Team (ERT) established by the EPA, when required. The NSF shall provide assistance to the OSC during Phase III, IV, and V operations as the circumstances of the situation dictates. When possible, the NSF will provide training to the Emergency Task Forces and participate with the Regional Response Team in regional and local contingency plan development.

The Strike Teams established by the U.S. Coast Guard are able to provide communications support, advice, and assistance for oil and hazardous materials removal. These teams include expertise in ship salvage, damage control, diving, and removal techniques and methodology. In addition, they are equipped with specialized containment and removal equipment and have rapid transportation available.

307.2 The Environmental Response Team was established to advise the OSC and RRT on environmental issues surrounding spill containment and removal and environmental assessment. The ERT has two components which are described briefly below:

(1) Operations Support provides advice on spill containment and cleanup including: application of dispersants, habitat restoration, cleanup technique and priorities, disposal of contaminated material, water supply contamination, and special considerations pertaining to hazardous materials.

(2) Scientific Support provides scientific support assistance including: trajectory analysis, chemical analysis, location of environmentally sensitive regions, assessment of environmental damage, and coordination of on-scene scientific activity.

APPENDIX C

SUMMARY ARTICLE ON U.S. AND CANADIAN COAST GUARD ROLES

(submitted to the 1987 Oil Spill Conference;
USCG-EPA-API)

CANADIAN-U.S. SPILL-RESPONSE COOPERATION ALONG THE GREAT LAKES

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Abstract: The United States and Canada share over 1,400 miles of aquatic border between the St. Lawrence River and western Lake Superior. In order to effectively deal with regional oil and hazardous-material spills which can equally affect either side of the border, Canadian and U.S. agencies have formed a cooperative agreement under the CANUSLAK plan to share resources and information prior to and during spill occurrences. Primary agencies involved include the Canadian and U.S. Coast Guards, U.S. National Oceanic and Atmospheric Administration, and the Canadian Environmental Protection Service (Emergencies Program). Examples of prespill cooperation, as discussed in this paper, include the joint preparation of contingency plan annexes and shoreline sensitivity atlases for the St. Lawrence River, Detroit-St. Clair River area, and St. Marys River. Cooperation during spills, also discussed, is illustrated by the exchange of information either by direct participation of both countries during response and cleanup or by advisory representation.

U.S. Legislation

In 1899, the first major legislation regarding water quality in the United States was passed. This act, known as the Refuse Act of 1899, protected the navigability of waterways by prohibiting the depositing of refuse in navigable waters, tributaries, or

upon their banks. It also provided for penalties that were criminal in nature as opposed to civil. In 1924, the Oil Pollution Act (33 USC 431-437) was passed by Congress which prohibited the discharge of oil from vessels. The Oil Pollution Act of 1961 (33 USC 1001) implemented the provisions of the 1954 International Convention for the Prevention of the Pollution of the Sea by Oil. These provisions recommended and resulted in the establishment of nearshore zones within 50 miles of the coast where the spilling of oil would be illegal. More recent legislation (MARPOL) has terminated this limit and has placed stricter enforcement on the discharge of oil at sea.

The Federal Water Pollution Control Act, 1972 (33 USC 1321 et seq.; hereinafter, the FWPCA; later amended in 1978 and referred to as the Clean Water Act), started the United States on a policy designed to prevent and control water pollution and improve the quality of the country's water resources. The essential provisions of the FWPCA regarding spill prevention and response originate in section 311(k) of the act. The act prohibits the discharge of harmful quantities of oil or hazardous substances into or upon navigable waters or the contiguous zone. The act provides for a civil penalty not to exceed $5,000 per incident which may be charged against the spiller. This act also imposed a criminal penalty for failure to notify the appropriate agency of the discharge and makes it a criminal act, upon conviction, for failure to do so. Penalties for failure to report may not exceed $10,000 or imprisonment for one year, or both.

One of the most important provisions of the act requires the federal government to remove the oil or hazardous substance(s) discharged under this act in the absence of a suitable and proper removal conducted by the owner or operator of the vessel or facility from which the discharge occurred. The Clean Water Act, Section 311(k), amended the FWPCA in 1978, allowing increased funding for federal removals and increased the liability for facilities. Costs were to be recovered by later action against the responsible party.

Originally, the FWPCA involved the discharge of oil as well as certain quantities of 297 designated hazardous substances. The Code of Federal Regulations define oil as "oil of any kind or in any form, including but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil." Oil of any kind has been interpreted to mean coconut oil, shale oil, olive oil, mineral oil, linseed oil, peanut oil, fats, greases, and petroleum-derived oil. Spill response to the 297

designated hazardous substances listed in FWPCA invariably occurs under the Comprehensive Environmental Response, Compensation, and Liability Act, Act of 1980, Pub Law 96-510, (CERCLA); however, the penalty provisions provided under FWPCA may be used to assess civil penalties. The net result is that oil spill response is performed under FWPCA, and chemical spill response is almost always performed under CERCLA.

The essential features of the FWPCA regarding U.S. Coast Guard (USCG) spill response in the Ninth District are the provisions which require immediate notification to the National Response Center (NRC) of a discharge. This may require an appropriate level of response by the federal government, insuring that a known spiller conduct a proper cleanup, or should the spiller be unknown, that effective cleanup operations are conducted by contractors. Jurisdiction of FWPCA is limited to discharges of oil and 297 specified chemicals in navigable waters as defined in 33 CFR 151.05(k)(1).

In 1980, due to the increasing national concern for the release of hazardous chemicals into the environment and the lack of clear legal authority to deal with these releases, Congress passed CERCLA.

The response provisions of CERCLA in many respects parallel those with which we are more familiar (Section 311 of the FWPCA). Both statutes (1) require notification by the responsible party of a hazardous substance release, (2) authorize a federal response which is not dependant on the cause or quantity of a release, (3) utilize the National Contingency Plan (NCP) as the blueprint of the federal response organization, (4) create a special fund to support government response costs, and (5) establish liability for government response costs subject to certain defenses such as an act of God, war, negligence on the part of the U.S. government, or an act or omission of a third party. The major differences between these remedies lie primarily within the scope of response jurisdiction provided by each. The FWPCA allows response to discharges of "oil of any kind or in any form" and 297 hazardous substances in certain designated waters only. CERCLA provides no authority for response to releases of oils, but it adopts without exception hundreds of substances listed or characterized as hazardous under four other environmental statutes (including the FWPCA's 297 designated hazardous substances) and creates a broad generic category, "pollutants or contaminants," to deal with the hazardous chemicals not formally designated as hazardous. In addition, CERCLA responses are not limited to

designated waters, but include releases to the air, land, and all ground and surface waters. One other important provision of CERCLA empowers the On-Scene Coordinator (OSC) to issue administrative orders compelling the responsible party to take corrective action in response to a release.

At present, the USCG and the U.S. Environmental Protection Agency (EPA) are the federal agencies responsible for the enforcement of FWPCA and CERCLA. Pursuant to an executive order, the USCG has been delegated responsibility for administration of the pollution fund provided under section 311(k) of FWPCA, and the EPA administers CERCLA, Hazardous Substances Response Trust Fund, commonly known as Superfund.

Under the provisions of these and other laws, the EPA developed the National Oil and Hazardous Substances Contingency Plan, more commonly referred to as the NCP. This plan provides for the efficient, coordinated, and effective response to discharges of oil and releases of hazardous substances, pollutants, and contaminants in accordance with the authorities of FWPCA and CERCLA. It also provides for the division of responsibilities among the federal, state, and local governments in response actions and directs the preparation of regional contingency plans for each federal region. While both the EPA and USCG are empowered to enforce both laws throughout the country, they have (under the auspices of the NCP) chosen to establish boundaries which determine zones of primary responsibility. Jurisdictional boundaries for the predesignated EPA and USCG OSCs have been established throughout the entire United States.

Organization and Response--United States Coast Guard

In the Great Lakes Region, Coast Guard District 9 (Fig. 1), the Captain of the Port (COTP) for each Marine Safety Office (MSO) zone has been designated the OSC for all releases of oils and hazardous substances in any form within this zone. This zone is generally defined as including all navigable waters and, in some cases, limited amounts of land areas adjacent to these waters. Any discharge into navigable waters of oil or hazardous substances, including shore-based facilities, is invariably handled initially by the USCG. This includes all releases from vessels. Chronic releases involving chemicals or oils are usually, after the initial USCG response, turned over to the EPA as are most releases from waste management facilities. Both the USCG and the EPA still have the authority to respond to spills in the other designated zones

and often do so because of distance, availability of personnel, or when immediate action is required.

A typical USCG response begins with a report of a spill, initiated either by a local call or one from the NRC in Washington, D.C. Depending upon the amount of information available, other calls might be initiated to the appropriate, state spill-response organization, the NRC, and depending upon location, the Canadian Coast Guard's Vessel Traffic Center (Sarnia, Ontario). The call to the traffic center would fulfill the requirements under the Canada-U.S. Joint Contingency Plan for notifying Canadian authorities. Additional calls to local Canadian Coast Guard bases would also occur if warranted. The MSO command structure would be notified by this time, and decisions regarding a suitable level of response would be made. The initial response level could include additional notifications to affected parties such as water-intake plants, the dispatching of investigators, collection of additional information, search and rescue efforts, establishment of the unit response organization, etc.

The initial assessment of all discharges into areas under USCG jurisdiction requires that the predesignated OSC determine whether the discharged substance is governed by FWPCA or CERCLA. In either case, procedures are available for the OSC to ensure that a proper cleanup is being conducted or that, alternately, the USCG take over operations. Federal funding under both laws is available should the USCG take over such an operation or should the source of the discharge be unknown. The laws also provide for reimbursement of such funding from the responsible party.

MSO personnel will attempt to mitigate the spill as much as possible with the equipment and resources at hand. These resources will vary from region to region. Generally speaking, USCG-owned spill equipment in the Great Lakes is limited to small quantities of boom and absorbents located near local USCG bases.

The major material resources available to the USCG-predesignated OSC for spill mitigation are local/national cleanup contractors and the National Strike Force. The United States is heavily dependent upon the private sector for its supply of labor and equipment in regard to dealing with spills of oil and hazardous substances. Because of the heavily industrialized nature of much of the Great lakes region, many of the required resources are available locally. The OSC also has available the equipment, talent, and experience of the National Strike Force.

The USCG elected in 1972 to concentrate much of its funding, equipment, and training in the creation of the Atlantic, Gulf, and Pacific Strike Teams. These teams

consist of personnel whose primary job is to respond to spills and offer advice, experience, and monitoring personnel to the OSC during an incident. The teams, which have readily available aircraft, possess large amounts of specialized equipment such as small boats, pumps, skimmers, boom, personal protective equipment, and dracone bladders which can be flown where needed. In addition, the relatively large number of spills with which the teams get involved produces a large body of knowledge and experience centralized in a small group of individuals available to the entire USCG. The strike teams and their equipment are also available to the EPA for use on spills and waste sites under the EPA's jurisdiction. National Strike Force personnel and equipment are unavailable for hire in the United States, but may be utilized by foreign countries on a reimbursable basis if equivalent commercial resources are not available.

Organization and Response--Canadian Coast Guard

The Canadian Coast Guard (CCG) has a well-developed mandate regarding pollution response in the Great Lakes derived from the Canada Shipping Act and from an agreement originally signed by Canada and the United States in 1972 called the Great Lakes Water Quality Agreement.

The Canada Shipping Act (Sections 732 and 760) confers certain powers upon designated Pollution Prevention Officers. This enables CCG personnel to conduct investigations of pollution incidents, including boarding a vessel for inspection or sampling purposes. The Oil Pollution Prevention Regulations SOR/71-495 (made 21 September 1971 pursuant to Sections 728 and 730 of the Canada Shipping Act) covers the discharge of oil from a vessel, the requirement to report, as well as the handling of cargo, fuel, and ballast.

The CCG is the lead agency responsible for insuring a response to ship-source pollution only. This differs from the USCG, who becomes involved in the initial response of land-based spills which enter the Great Lakes, including spills from waste-management facilities. The CCG will also respond as a resource agency when requested by other government departments or industry. All CCG response is on a cost-recovery basis.

The CCG branch responsible for spill response and contingency planning is the Marine Emergencies Branch (MEB). The Great Lakes is in the CCG Central Region, which covers all of Ontario and Manitoba and includes James Bay and Hudson Bay.

The MEB is small; however, unlike the USCG, the branch is operational, possessing and maintaining a large inventory of pollution-response equipment. There are seven depots and six marine emergency response trailers stationed in various locations in the Great Lakes. These depots contain boom, skimmers, slicklickers, pumps, sorbents, and other countermeasure equipment. Each depot is well equipped with watercraft to enable equipment deployment. The 24-hour emergency number is the same for all the Great Lakes area--the CCG Vessel Traffic Centre in Sarnia. This is also the focal point for information transfer between Canada and the United States.

The philosophy behind the CCG response policy is as follows. The polluter has the primary responsibility for spill response and cleanup. If the polluter cannot or will not respond, the CCG is prepared to initiate the first response, using CCG equipment for the first few days or as long as it takes for the situation to stabilize. After the situation is controlled, the CCG will bring in contractors to conduct the cleanup and any remedial measures activities. The response by the CCG is conducted on a cost-recovery basis, as the CCG will attempt to recover the expenses from the spiller in court action. Because of the low number of contractors in Canada with pollution response equipment in the Great Lakes region, the CCG will rent out equipment to contractors at rates comparable to those of private industry.

The CCG has made a commitment with the Federal Department of the Environment and the Provincial Ministry of the Environment, agreeing that the CCG would respond as the lead agency to any spills of unknown origin (mystery spills) in the Great Lakes.

The Great Lakes Water Quality Agreement, Annex 9, designates the Canadian and United States Coast Guards as the responsible parties with the task of developing and maintaining activities under a Joint Canada-United States Marine Pollution Contingency Plan. The plan was to develop the ability of a coordinated response to spills of oil and other noxious substances. The plan supplements existing national, provincial, state and regional plans. Five regional plans were developed:

1) CANUSDIX (covering the Dixon entrance).
2) CANUSNORTH (covering the Beaufort Sea).
3) CANUSPAC (covering the Pacific Coast).
4) CANUSLAK (covering the Great Lakes).
5) CANUSLANT (covering the Atlantic Coast).

The CANUSLAK plan was developed and initially signed in 1974, revised substantially, and signed again in 1983. -90-

The plan basically outlines the response organization structure for an incident involving or likely to involve boundary waters. There is provision for predesignated OSCs. Unlike the USCG, who have several predesignated OSCs (usually the Captain of the Port), the CCG officially has only two predesignated OSCs--one covers the St. Lawrence and lower Great Lakes up to the Goderisch area in Lake Huron; the second covers the Upper Great Lakes and Georgian Bay. There are deputy OSCs covering subdistrict response.

The CANUSLAK plan also provides for a Joint Response Team (JRT), composed of experts from Canadian and United State government agencies. As the St. Lawrence River and Great Lakes cover six states, there are different U.S. members on the JRT depending on the location of the spill which differs from the Canadians, who have the same members on the JRT no matter where in the Great Lakes the spill occurs.

The JRT is co-chaired by the USCG and CCG. The chairperson is determined according to which side of the border the spill originated. A spill initially occurring in U.S. waters but threatening Canadian waters would, for example, fall under the auspices of the joint plan. In this circumstance the USCG would chair the JRT, and the chairperson, in concert with the co-chairperson (CCG), would decide whether the spill situation warranted activating the joint plan. Notification and alerting procedures commence with a simple telex and phone call to the various government agencies. The next level of notification requires the JRT chairpersons to immediately notify each other of potential pollution threats to boundary waters by a telex entitled CANUSLAK TOXINTOCSIN, as described in the joint plan. This alerts the JRT that the plan may be invoked so they can prepare themselves for travel if necessary. Finally, TOXIN SITREP telexes are distributed, giving situation reports as information is received. A telex and/or phone call (followed by a telex) will alert the JRT that the joint plan has been invoked if the co-chairpersons decide the situation warrants a joint response.

Joint Contingency Planning

Under the CANUSLAK joint contingency plan, a series of supplements were prepared in areas most likely to experience spills. These areas include the St. Lawrence River for which the text was first prepared in 1975, the St. Clair/Detroit River system which was prepared in 1978, and the St. Marys River which was prepared in 1986 and is currently under review. Each of these sites represents a choke point where shipping lanes are reduced to a relatively narrow river passage.

The supplements to the CANUSLAK plan essentially serve as a local contingency plan. In contrast to other plans individually generated in Canada or the United States, the CANUSLAK supplements include resources from both sides of the border. Briefly, these documents contain the following information:

1) Frequently updated agency and personnel lists with phone numbers.
2) A map and list with telephone numbers of all freshwater intakes.
3) A map and listing of areas of ecological sensitivity with species, habitat (shoreline, open water, etc.), and seasonality
4) A map summarizing river currents and velocities for boom placement.
5) A map summarizing ice conditions.
6) A map and listing of equipment-staging and river-access sites.

In 1983, a memorandum of understanding was signed by the U.S. National Oceanic and Atmospheric Administration (NOAA) and Environment Canada calling for the joint development of a series of shoreline sensitivity maps to complement the three regional supplements. The sensitivity maps were to provide an additional response and planning guide to the region, particularly concerning the protection of sensitive shoreline environments and wildlife. Under this agreement, the CCG graciously provided the helicopter and support personnel, with Environment Canada providing funding for the Detroit/St. Clair map series. NOAA, through a contract with the Research Planning Institute, Inc. (Columbia, South Carolina), provided editing, review, artwork, and initial printing. It was decided to follow the map format used by NOAA for approximately 95 percent of the U.S. shoreline, including several portions of the Great Lakes. This format consists of the following key components.

A. Classification and ranking of shorelines on a scale of 1-10 with 10 being the most sensitive. Shorelines were classified during ground and helicopter surveys. This

classification scheme was developed in conjunction with Dr. C.E. Herdendorf of Ohio State University and is unique to the freshwater system of the Great Lakes. Shoreline classifications are listed below in order of increasing sensitivity to spilled oil (see Gundlach and Hayes, 1978, for further explanation):

1) Exposed bedrock bluffs
2) Exposed sedimentary bluffs
3) Shelving bedrock shores
4) Sand beaches
5) Mixed sand and gravel shores
6) Gravel shores
7) Riprap structures
8) Sheltered rocky shores
9) Low vegetated banks (with grasses or trees)
10A) Fringing wetlands
10B) Broad wetlands

Walls and harbor structures (primarily sheetwall) were also indicated on the maps but were not ranked. Their sensitivity to oil is considered low.

B. Biological resource areas were indicated symbolically to provide the response effort with an overall description of the critical wildlife present. Information was synthesized from a variety of published and unpublished reports (including the previously prepared CANUSLAK supplements) to provide a comprehensive evaluation of all wildlife groups--birds, fish and mammals.

C. Socioeconomic resources indicated on the maps include those particularly vulnerable and having high social value. These include water intakes, marinas, parks and public recreational areas, and power plants. Drinking water intake locations are a highly vulnerable and unique problem in the Great lakes region. As such they were individually located on the maps and refer the user to a list containing an emergency phone number.

Map Format. All information was placed on Canadian (1:25,000 scale) and U.S. (1:24,000 scale) topographic maps. It was fortunate that the map scales for both countries were so similar; had they not been, the details lost during enlargement or reduction of one countries maps would have been a serious problem. The maps were then reproduced photographically and laminated to a format 35 cm wide by 42 cm high. Maps were enclosed in a binder with each individual map being removable for easy use in the field. All shoreline types were color coded. Biological resources were also color coded and illustrated by symbols as presented in Figure 2. Seasonal occurrence, endangered status, and species information, was presented within the same biological symbol. Species information, indicated by a number, was consistent

throughout all three mapping projects. The locations of sites having high socio-economic value were also indicated by symbols (Fig. 2).

Text Format. Included within the map atlas was a five- to six-page explanation of the sensitivity atlas. Also included was a description (with photograph) of each shoreline type and how oil reacts as it impacts that shoreline. General guidelines for protecting and/or cleaning up each shoreline type one were also presented.

Map Review. Drafts of all maps were reviewed by various agencies and individuals in an effort to acquire specific local information that may not be available through the usual government and published data bases. Agencies that reviewed the maps were provincial/state and federal wildlife and natural resource agencies. The review process inherently produced a delay in the final production of the map atlases, but was a necessary and integral part of the shoreline sensitivity analysis.

Problems. In addition to the delays caused by the review process, it was of great concern that the only original set of maps might be lost during the transferal process from one reviewer to another. Another problem was generated during the transfer process across the U.S.-Canadian border. Twice, the original map set was seized by Canadian customs, requiring that an import duty be paid on the perceived value of the maps. This was later clarified through an official government exemption from payment; however, two months were lost trying to untangle this. The last problem concerns the cost of the maps. The photo-reproduction process, while producing a very accurate representation of the background topographic map, was a relatively expensive process which limits the potential distribution of the maps. NOAA views the maps as response tools to be used primarily by local Coast Guard personnel and NOAA. As such, only a limited number of copies are initially printed and distributed. The Canadian intent is to distribute maps to essential government response agencies and hope that local and industrial response groups would also be interested in acquiring copies. Due to the relatively high cost and exchange rate, there was relatively little interest.

Summary

A cooperative effort involving U.S. and Canadian agencies has resulted in a contingency plan and information exchange for the Great Lakes area. It is hoped that cooperative efforts such as this continue to be developed throughout international borders to plan for and respond to pollution spills.

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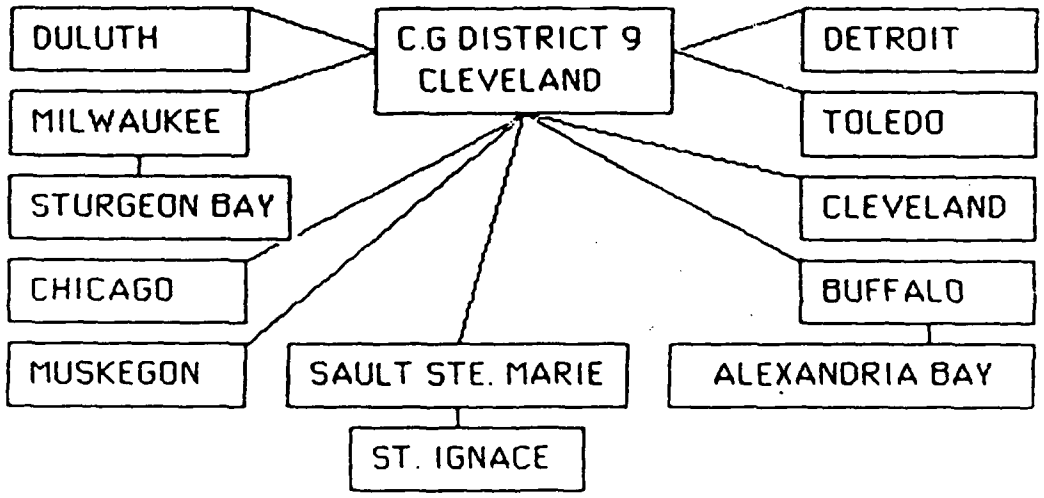
Mew, H.E. Jr., A. Rooney-Char, and Capt. J.D. Webb. 1983. Organizational obstacles to decision-making during oil spills. In Proc. 1983 Oil Spill Conference, API Publ. No. 4356, Amer. Petrol. Inst., Wash., D.C.

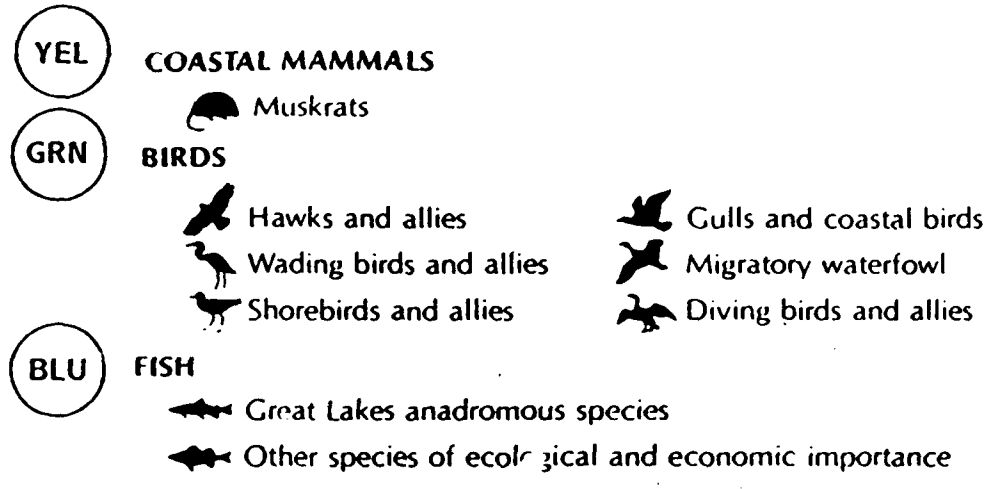
U.S. COAST GUARD MARINE SAFETY OFFICES IN THE GREAT LAKES*



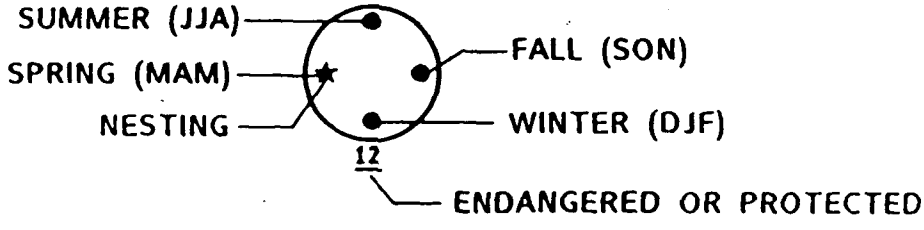
* Sturgeon Bay and St. Ignace are Marine Inspection Offices.
Alexandria Bay is a Marine Safety Detachment.

FIGURE 1. Organization of Coast Guard District 9. Great Lakes Region.

BIOLOGICAL COMPONENTS



SEASONALITY



SOCIOECONOMIC RESOURCES

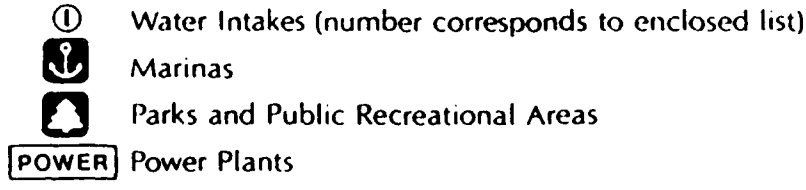


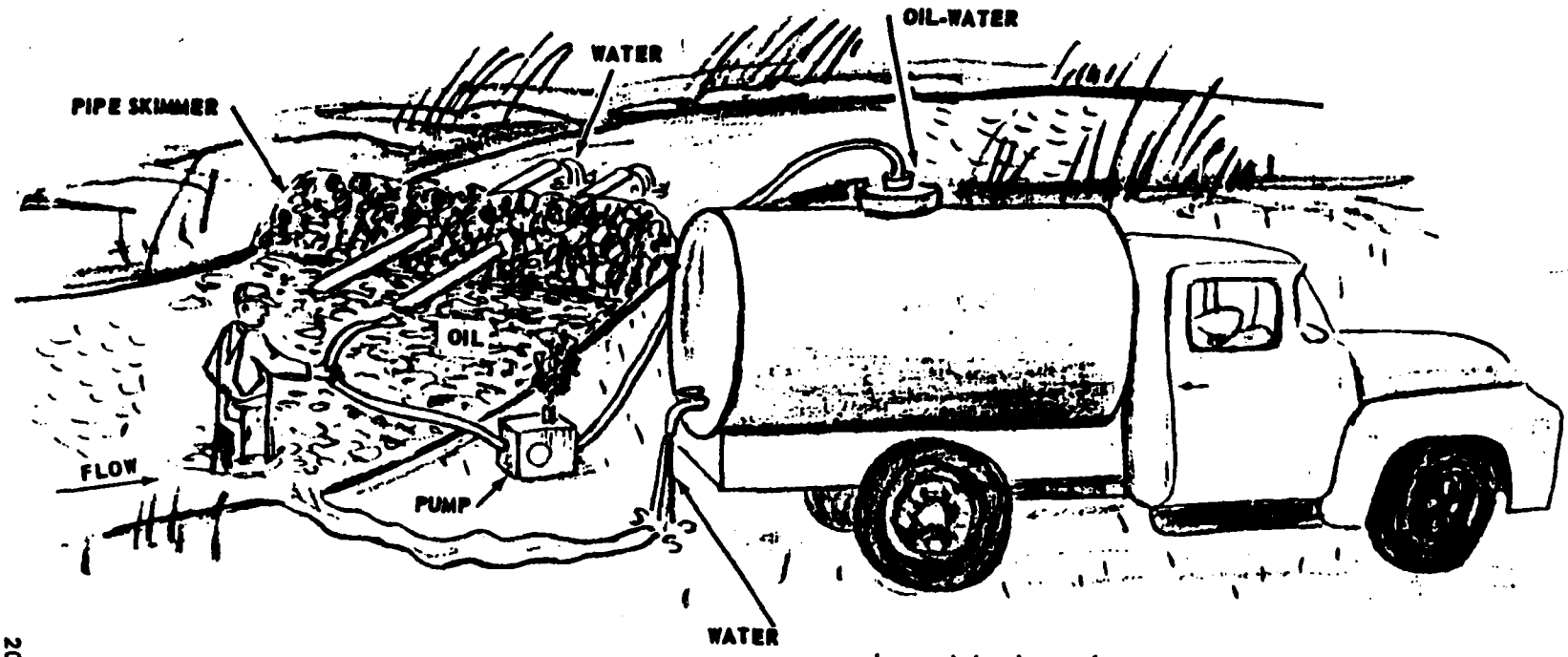
FIGURE 2. Keys to symbols and information presented in shoreline sensitivity maps of the Great Lakes.

APPENDIX D

DIAGRAMS INDICATING TECHNIQUES TO CONTAIN AND RECOVER OIL

(from Pennsylvania's Water Emergency Response Manual, 1986
and
National Park Service, Oil and Hazardous Substances Pollution Contingency Plan, 1986)

USE OF TANK TRUCK

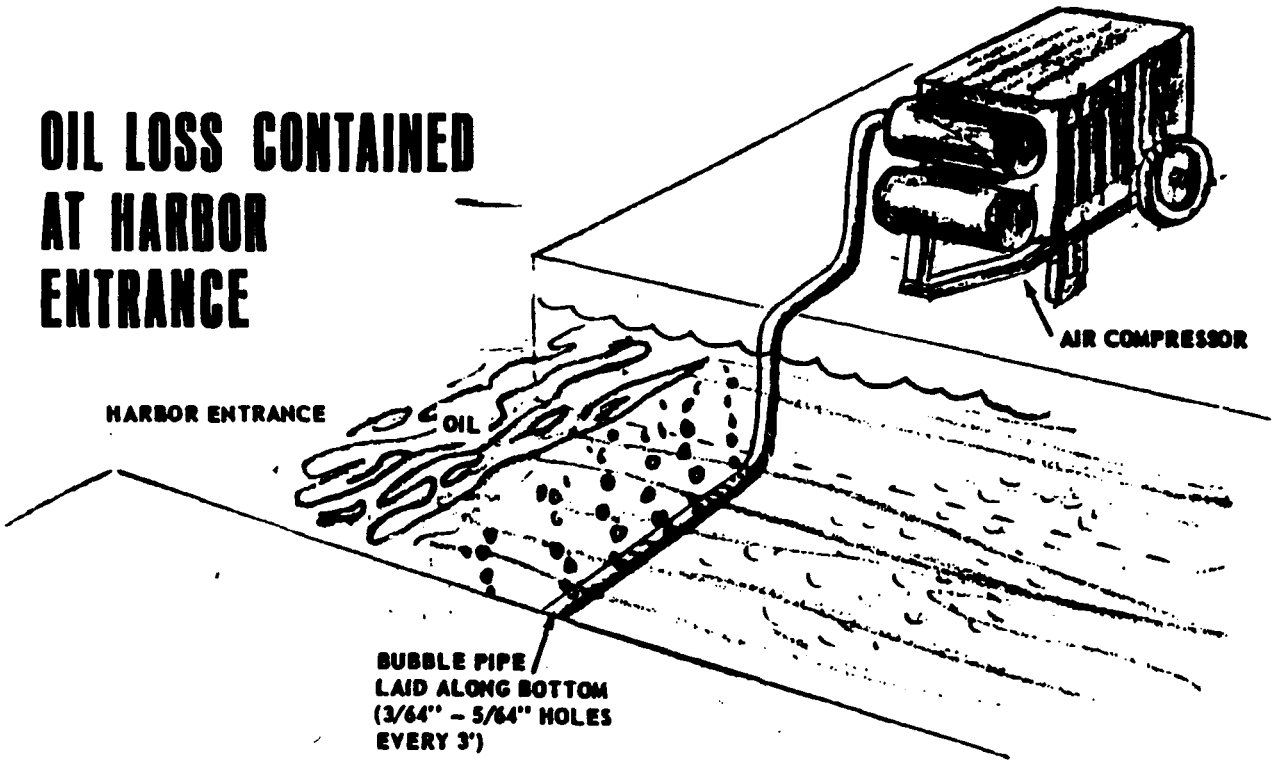


(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

Impounded oil may be removed from a stream by pumping it into a tank truck. The oil-water mixture is pumped into the top of the tank and, after separation of oil and water, the water may be returned to the stream by opening a valve at the bottom of the tank. Sufficient settling time should be allowed to permit a fairly complete separation.

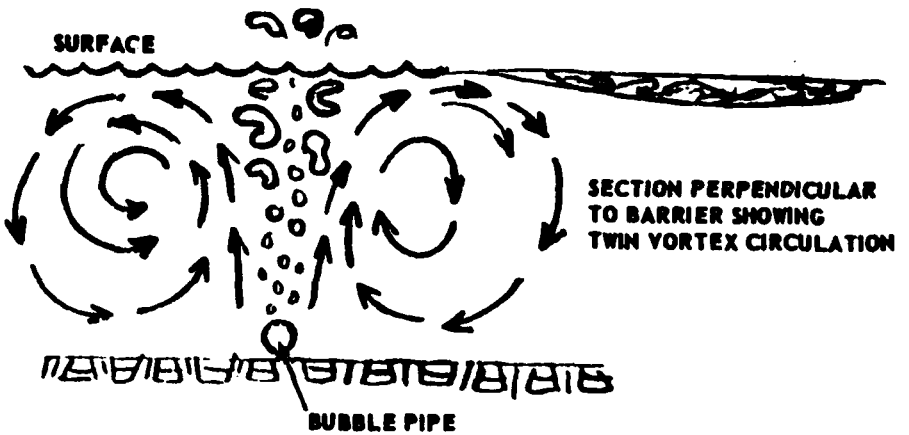
FIGURE 20

OIL LOSS CONTAINED AT HARBOR ENTRANCE



Perforated hoses and an air compressor can make an effective oil slick barrier where calm waters prevail.

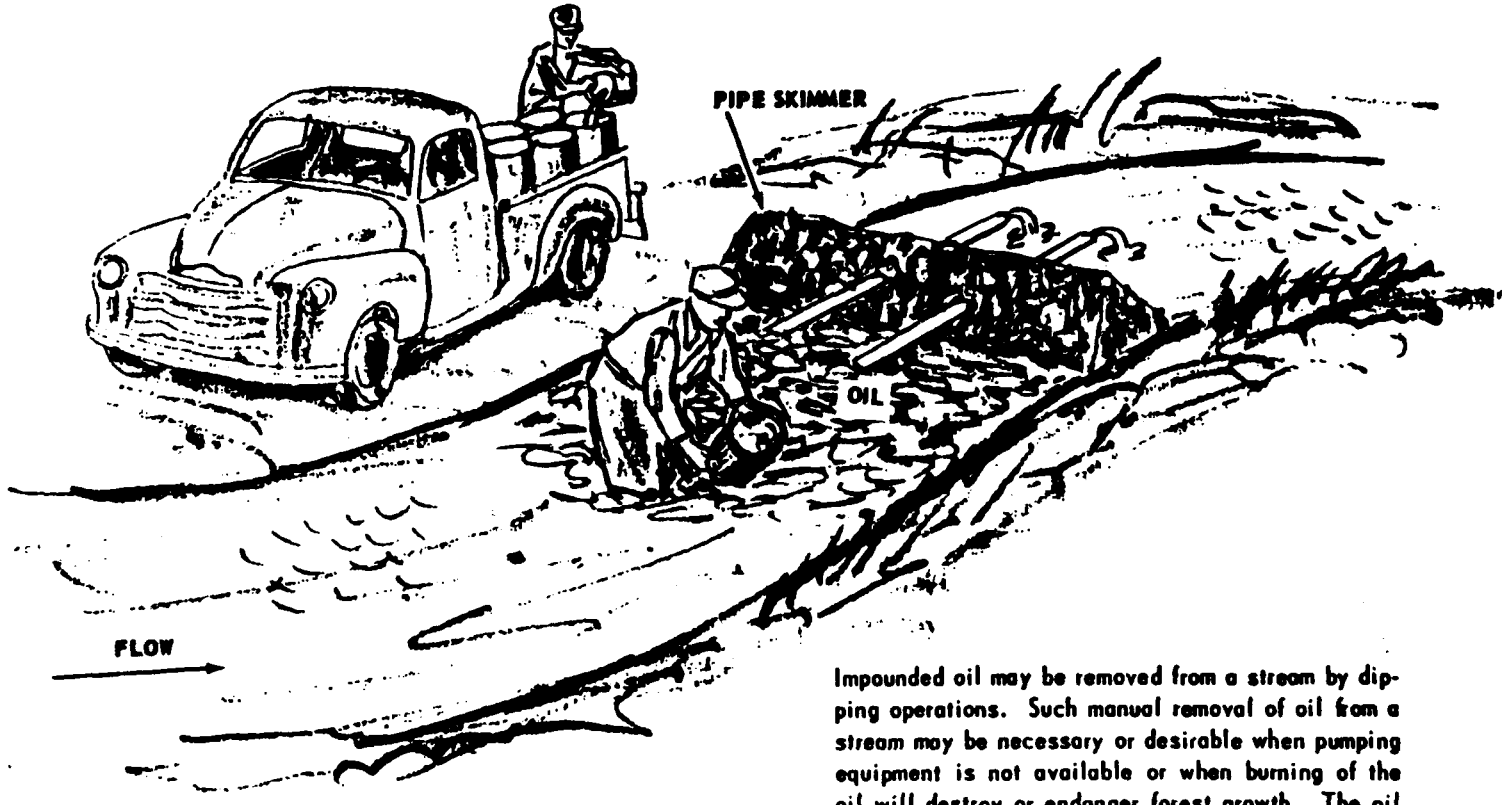
FIGURE 12



200-13-U

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

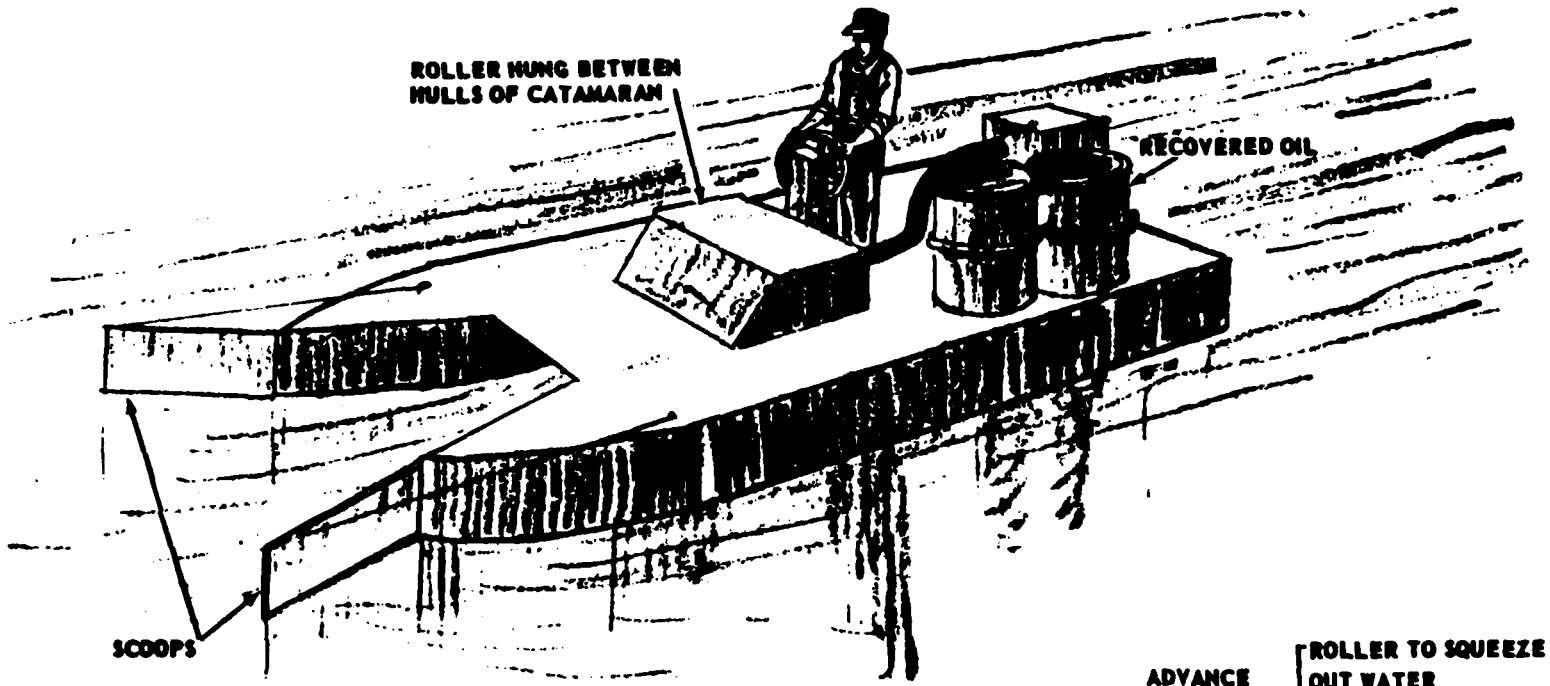
USE OF OIL DRUMS

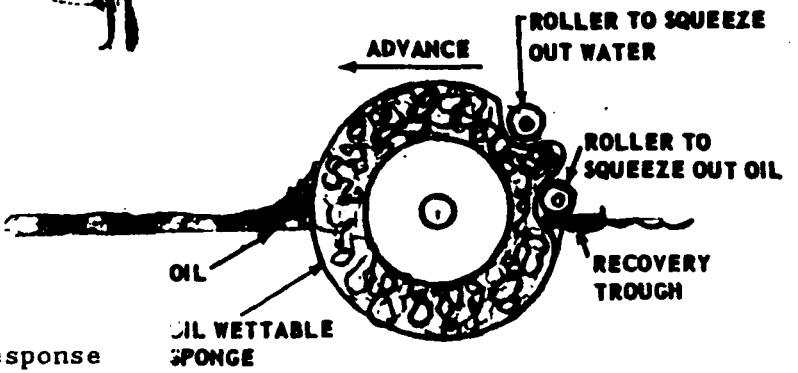


(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

Impounded oil may be removed from a stream by dipping operations. Such manual removal of oil from a stream may be necessary or desirable when pumping equipment is not available or when burning of the oil will destroy or endanger forest growth. The oil thus removed may be deposited in drums and trucked away from the vicinity of the stream to be salvaged

FIGURE 19

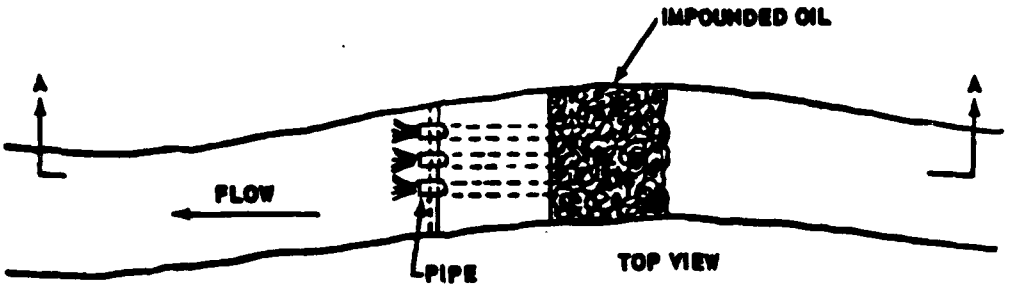




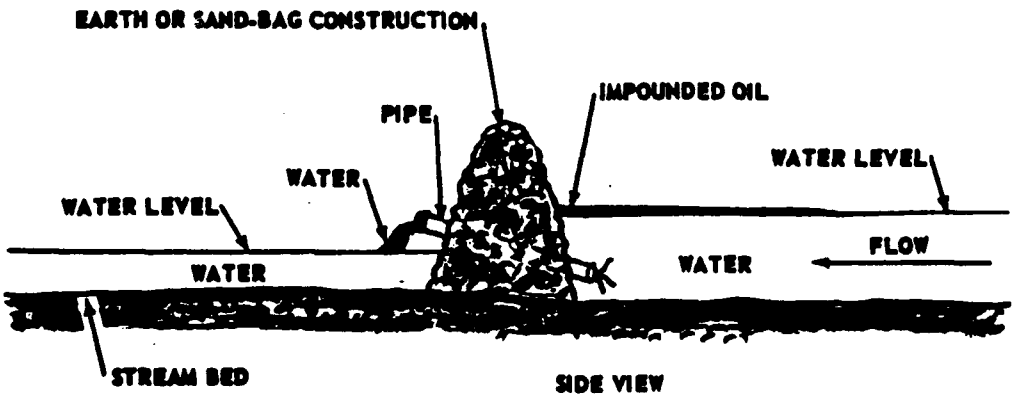
Boat mounted roller skimmers have found increasing use in oil pollution cleanup work and in general housekeeping operations around industrial and terminal complexes. Their mobility insures maximum work potential without interfering with navigation.

FIGURE 22 (from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

PIPE SKIMMING DAM



Sufficient pipe must be used to handle maximum stream flow. This type of installation is not satisfactory for large volume of water such as river, large creek, etc.



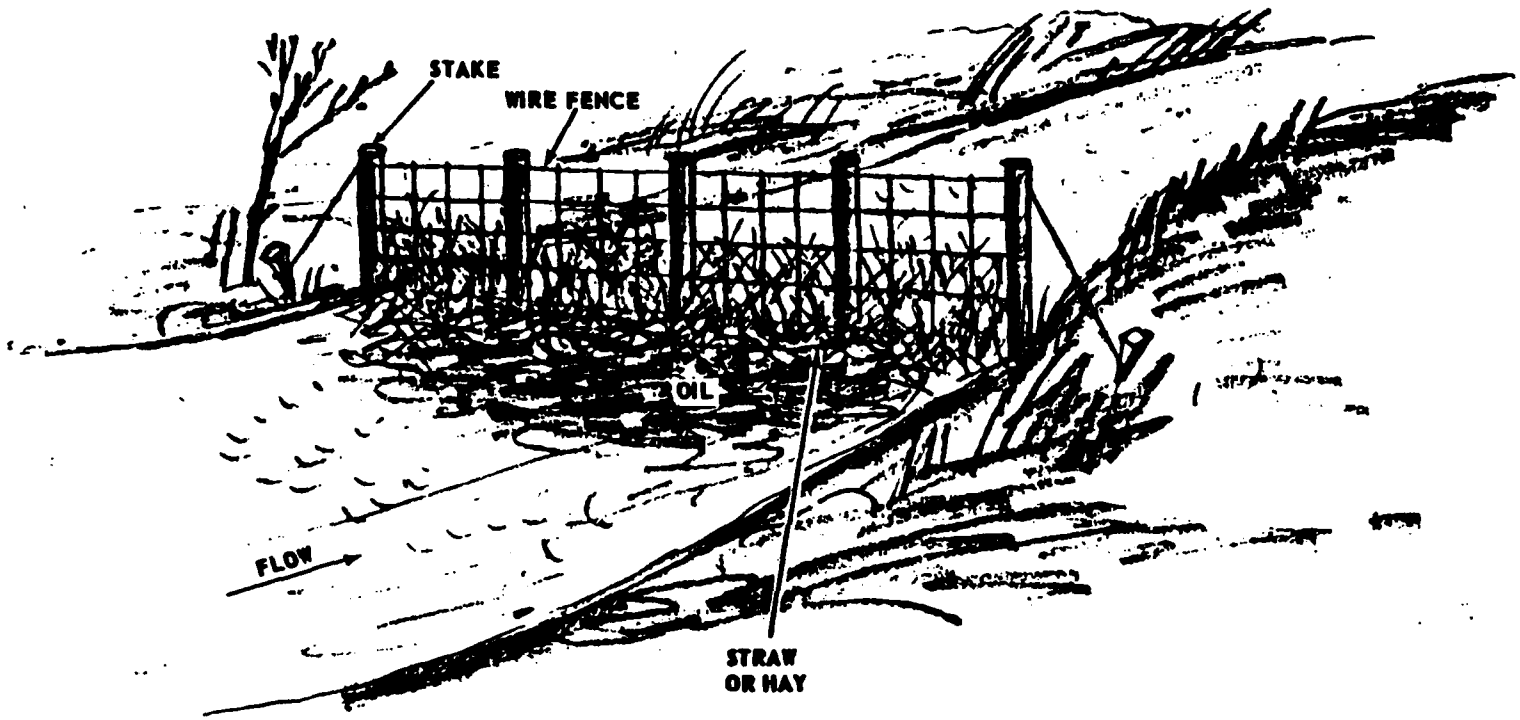
Number, size, length and exact position of pipe vary with volume of water, velocity, width of stream and other circumstances.

FIGURE 7

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

200-13-I

STRAW SKIMMING INSTALLATION

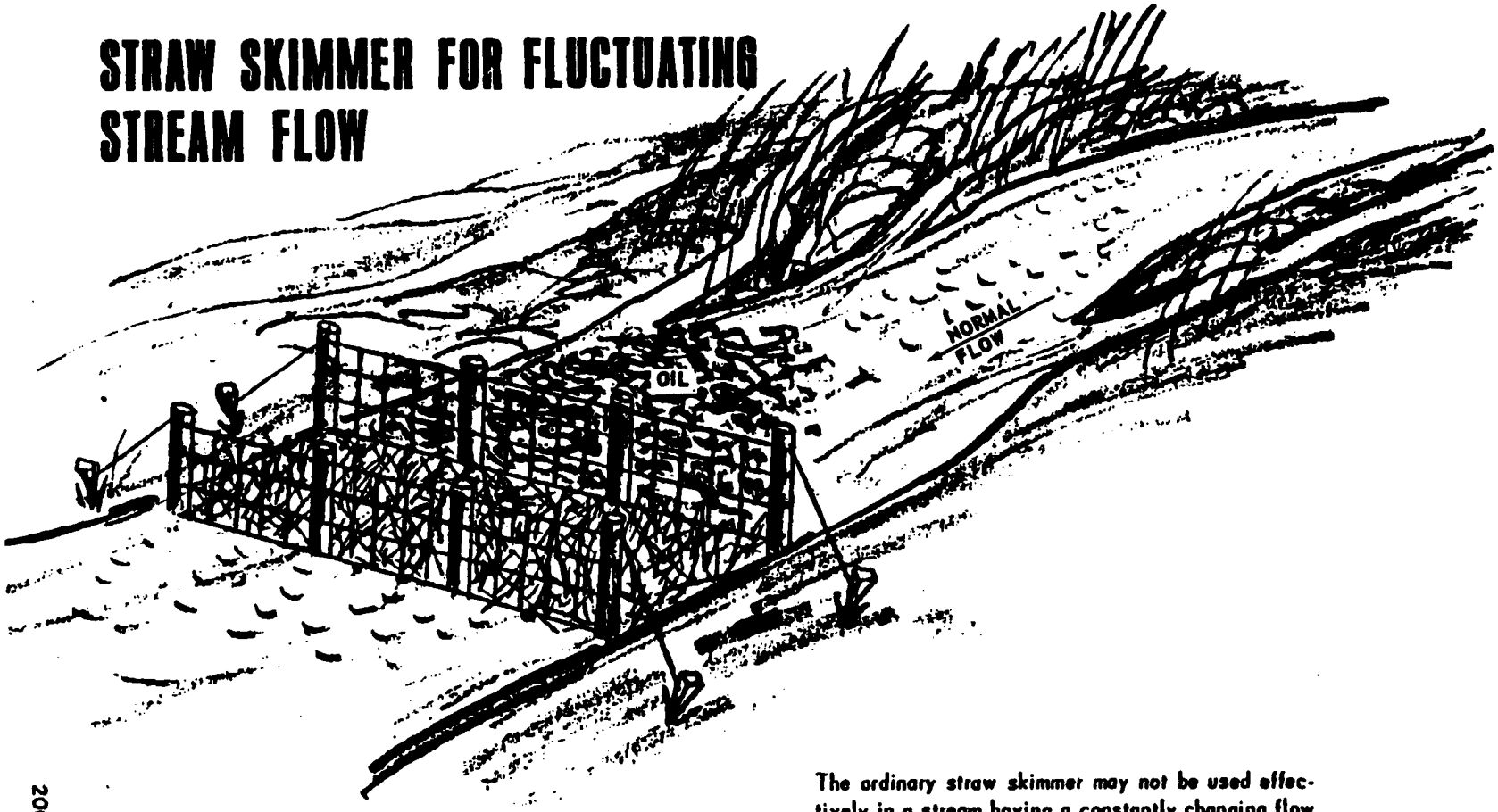


Stretch wire fence across stream and anchor securely. Straw is placed on upstream side of fence. This type of installation should be used in a location where the stream banks are of sufficient height and movement of water is relatively slow.

FIGURE 3

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

STRAW SKIMMER FOR FLUCTUATING STREAM FLOW



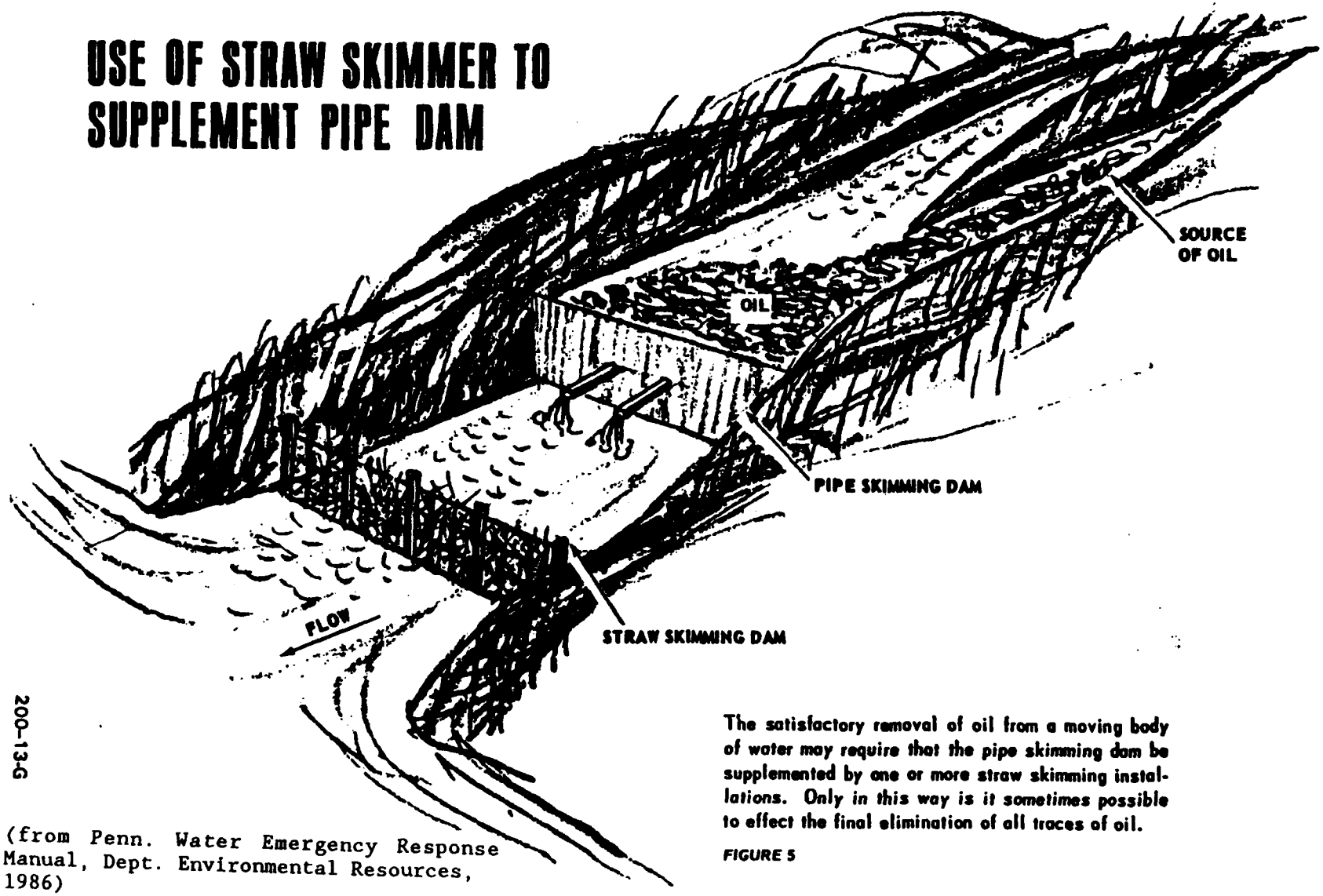
(from Penn. Water Emergency Response Manual, Dept. Environmental Resources,

The ordinary straw skimmer may not be used effectively in a stream having a constantly changing flow direction. When this type of skimmer is installed in a body of water which is subject to a fluctuating flow movement, the straw must be held in place by wire fence on both sides of the straw.

FIGURE 4

200-13-F

USE OF STRAW SKIMMER TO SUPPLEMENT PIPE DAM



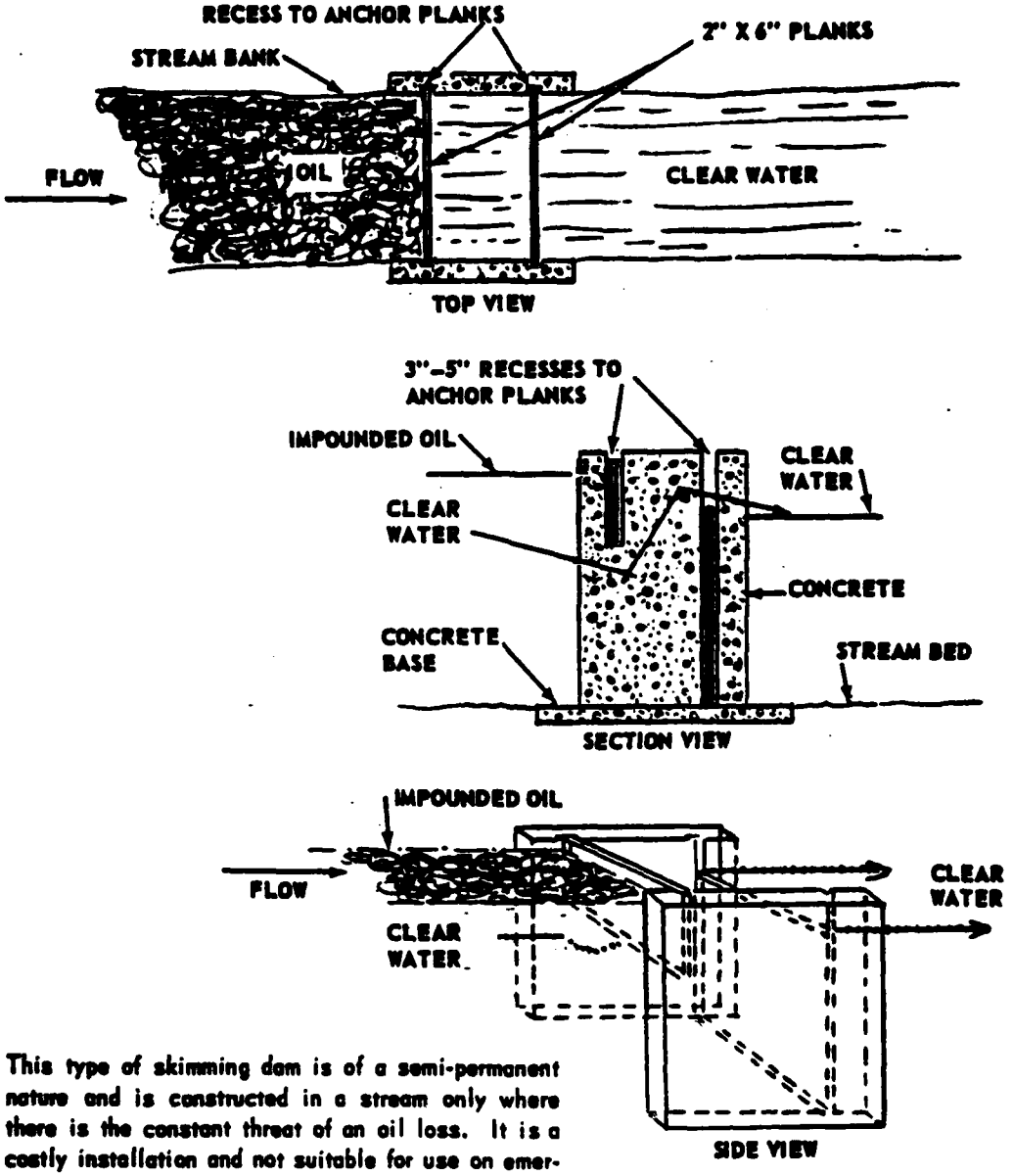
The satisfactory removal of oil from a moving body of water may require that the pipe skimming dam be supplemented by one or more straw skimming installations. Only in this way is it sometimes possible to effect the final elimination of all traces of oil.

FIGURE 5

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

200-13-G

SEMI-PERMANENT PLANK SKIMMER



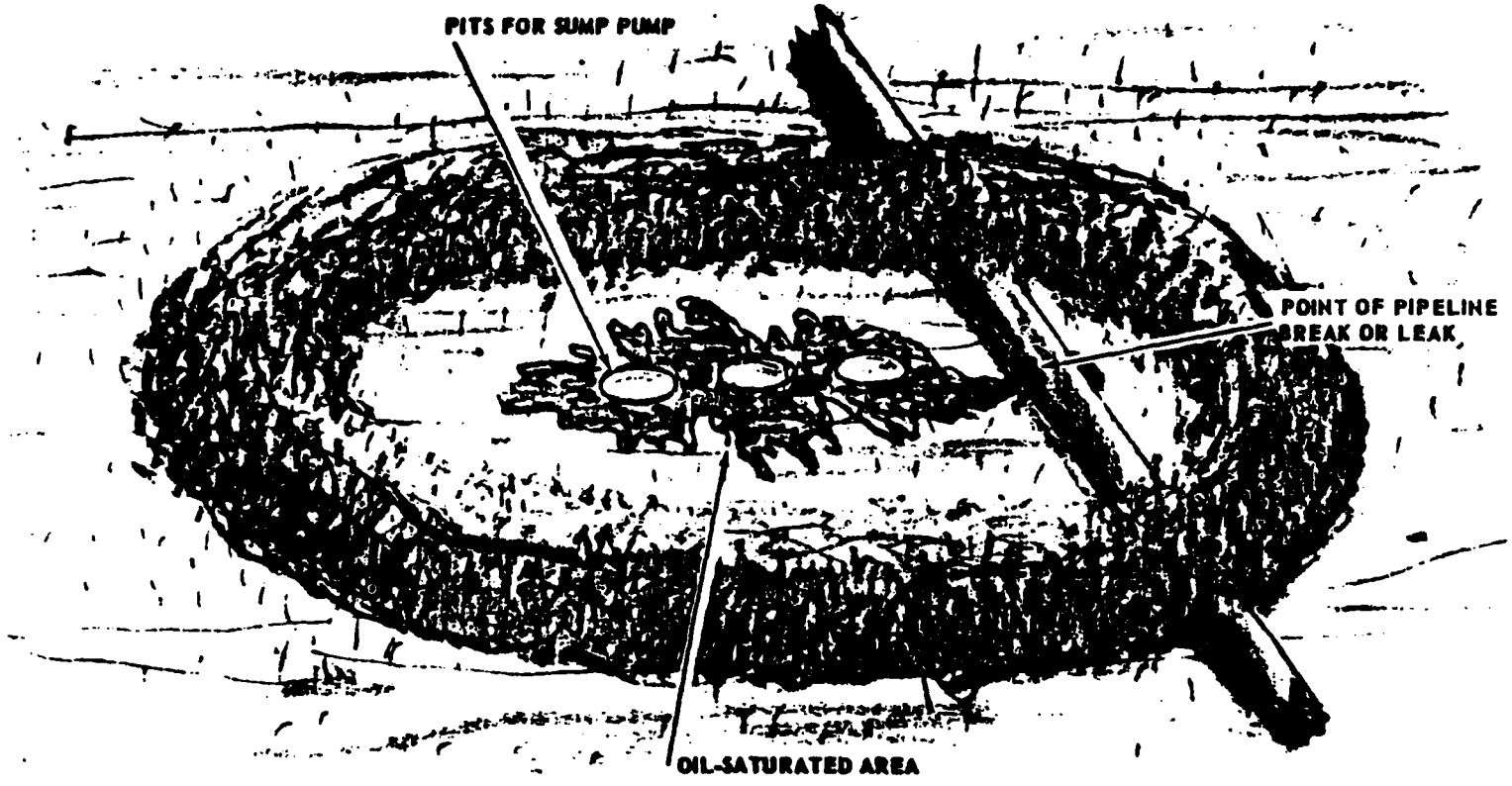
This type of skimming dam is of a semi-permanent nature and is constructed in a stream only where there is the constant threat of an oil loss. It is a costly installation and not suitable for use on emergency oil losses. It is effective under all normal conditions in impounding oil and requires infrequent inspections since either a satisfactory stream flow level is maintained or the water remains static.

FIGURE 6

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

200-13-H

OIL LOSS ON FLAT LAND



Construct dike (or plow furrow) around oil. Pits should be dug in lowest areas to permit concentration and removal of oil by sump pumps.

FIGURE 8

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

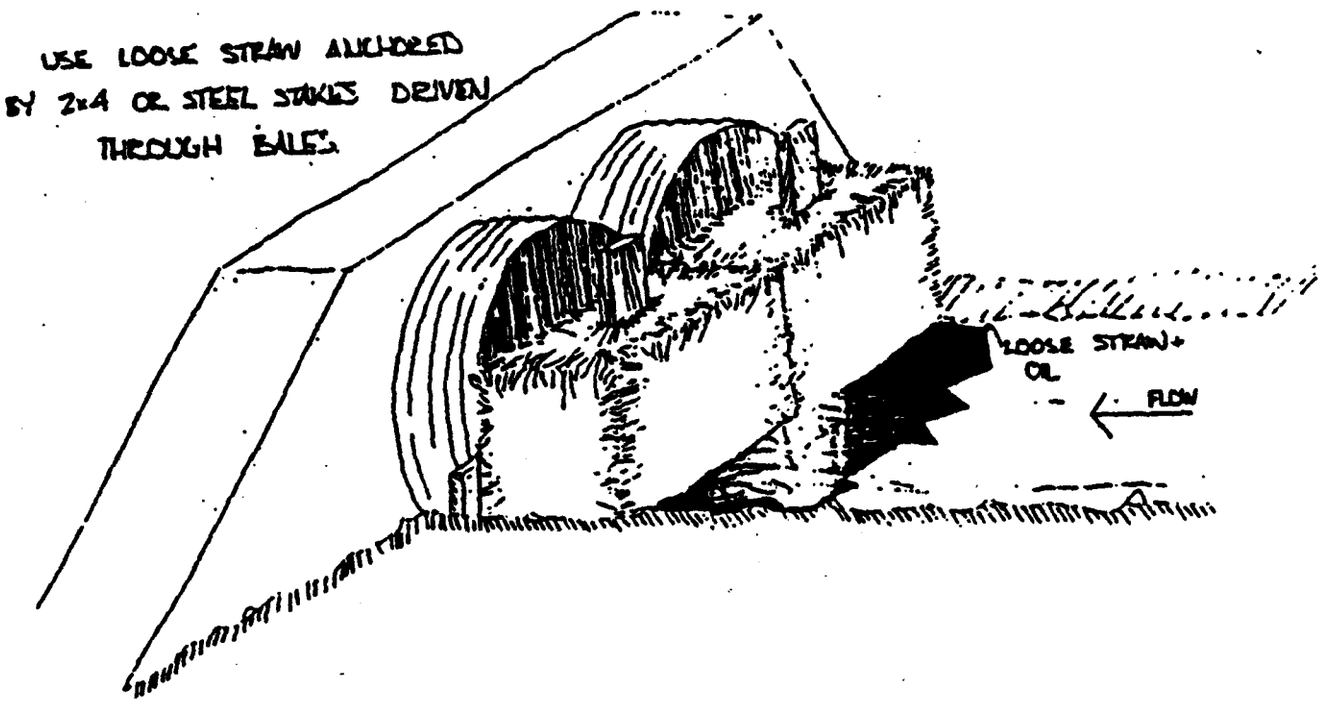


FIGURE 21 STRAW BOOM ATTACHED TO CIRCULAR CULVERTS

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

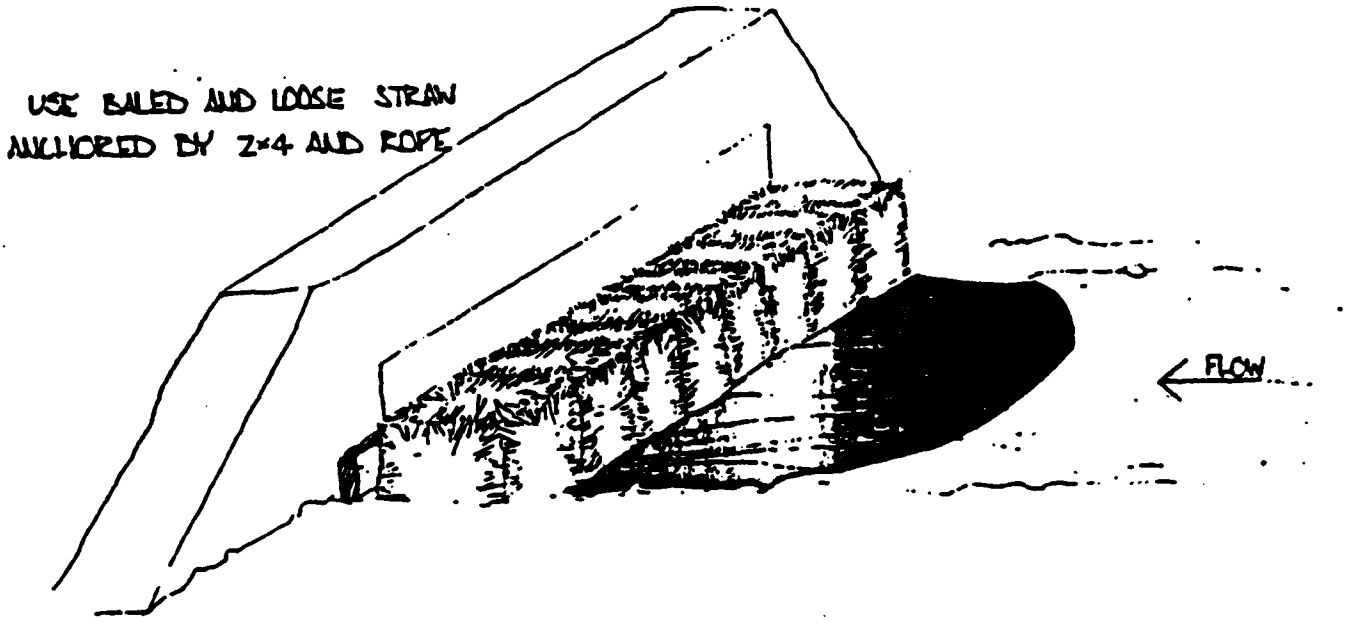
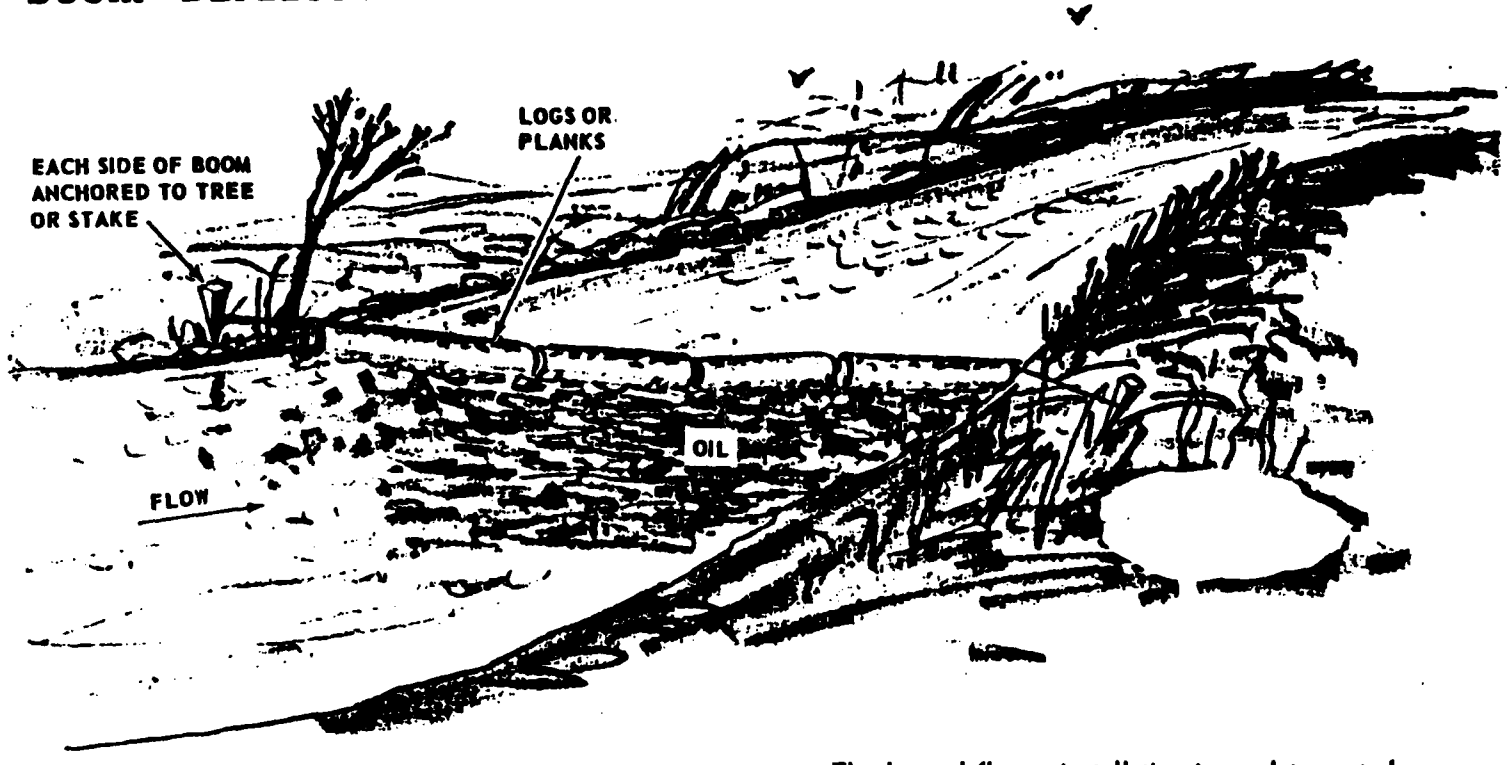


FIGURE V-20 STRAW BOOM (ATTACHED TO ROAD BRIDGE)

(from National Park Service, Oil and Hazardous Substances Pollution Contingency Plan)

BOOM DEFLECTOR

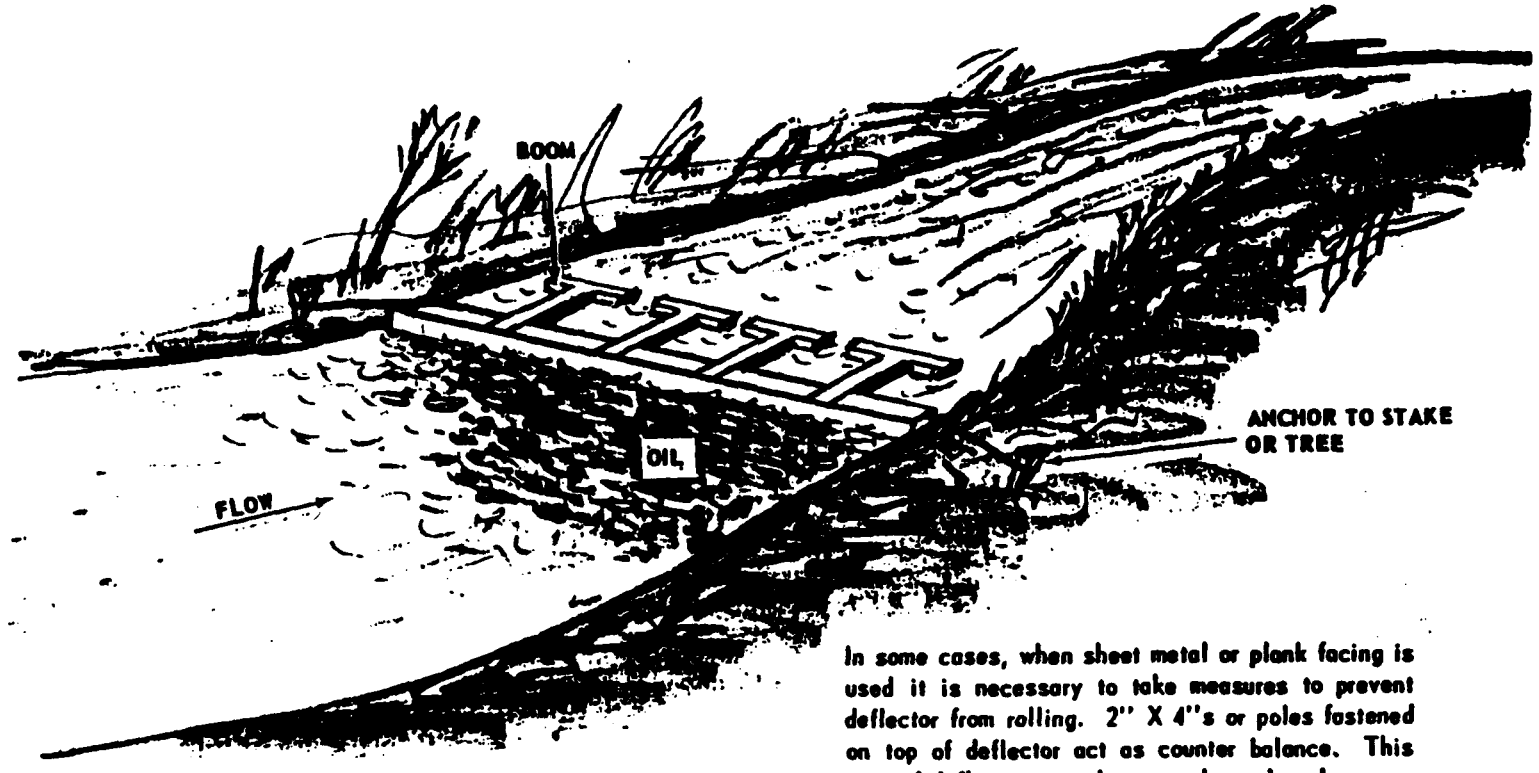


(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

The boom deflector installation is used to control the movement of oil in rivers where it is necessary to contend with a large volume of water and where the use of a straw skimming installation is impossible or impractical. Proper construction of a plank or telephone pole boom deflector permits the removal of oil from the river at one point of collection.

FIGURE 2

BOOM DEFLECTOR

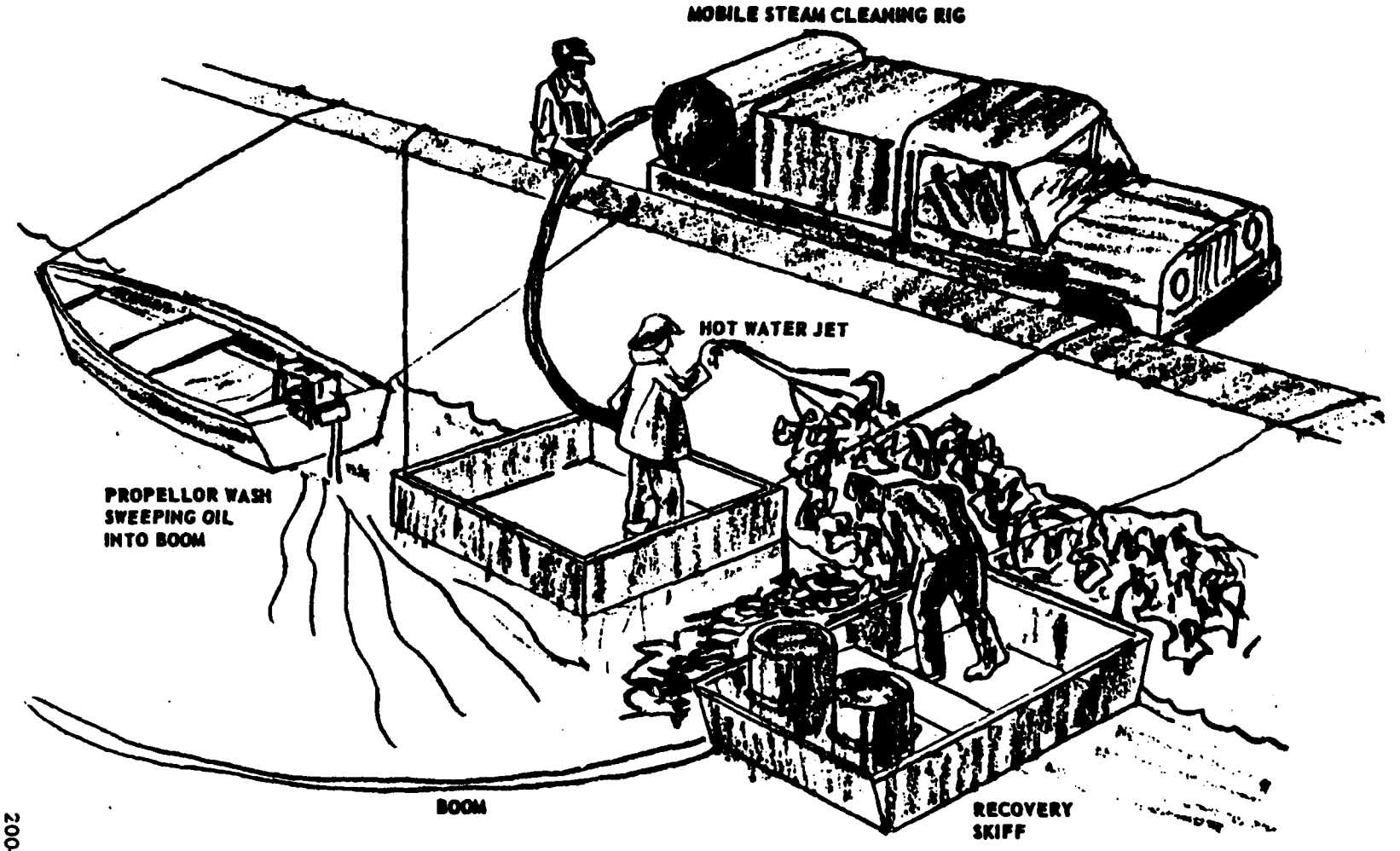


In some cases, when sheet metal or plank facing is used it is necessary to take measures to prevent deflector from rolling. 2" X 4"s or poles fastened on top of deflector act as counter balance. This type of deflector must be securely anchored.

FIGURE 1

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

200-13-C

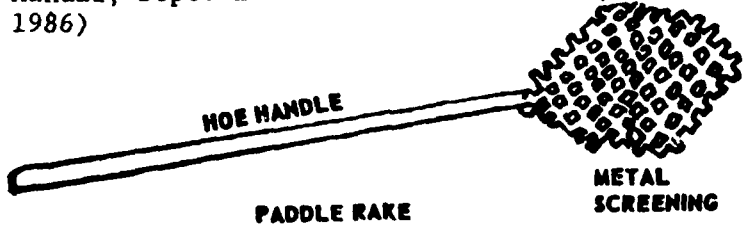


200-13-Q

Steam is an excellent surface cleaner and is effective in removing oil from any solid surface such as vessel hulls, breakwaters and/or pilings.

FIGURE 21 (from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)



Easily fabricated paddle rakes are a good tool for removing clumps of oil saturated straw, debris or solidified globs of heavy oil which become tarry in water during cold weather.

FIGURE 17

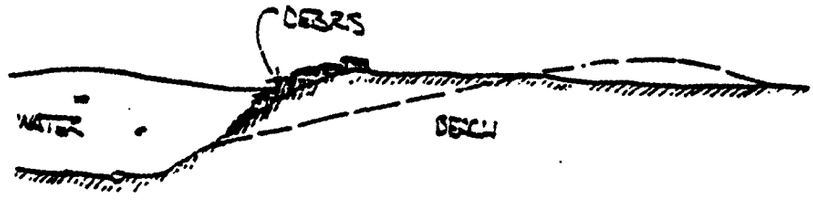
APPENDIX E

DIAGRAMS INDICATING OIL REMOVAL TECHNIQUES

TO MITIGATE ENVIRONMENTAL DAMAGE

(from Pennsylvania's Water Emergency Response Manual, 1986
and
National Park Service, Oil and Hazardous Substances Pollution
Contingency Plan, 1986)

FIGURE V-14



Cross-section after bulldozing beach material and debris into wave run-up zone.

FIGURE V-15

Method of Limiting Oil Damage to a Beach or Sandy Shoreline

(from National Park Service, Oil and Hazardous Substances Pollution Contingency Plan)

COVERING OIL BY SANDING

The final traces of an oil loss may be removed by covering the affected area with a coating of sand. Heavy sanding is recommended as a means of controlling the surface movement of oil from an oil-saturated area in close proximity to a stream. No attempt should be made to eliminate oil by sanding alone when a large amount of free oil is in evidence on the surface of the ground.

FIGURE 4

(from Penn. Water Emergency Response Manual, Dept. Environmental Resources, 1986)

APPENDIX F

METHODS TO DEFLECT OIL IN SWIFT-MOVING STREAMS

(from Pennsylvania's Water Emergency Response Manual, 1986
and
National Park Service, Oil and Hazardous Substances Pollution Contingency Plan, 1986)

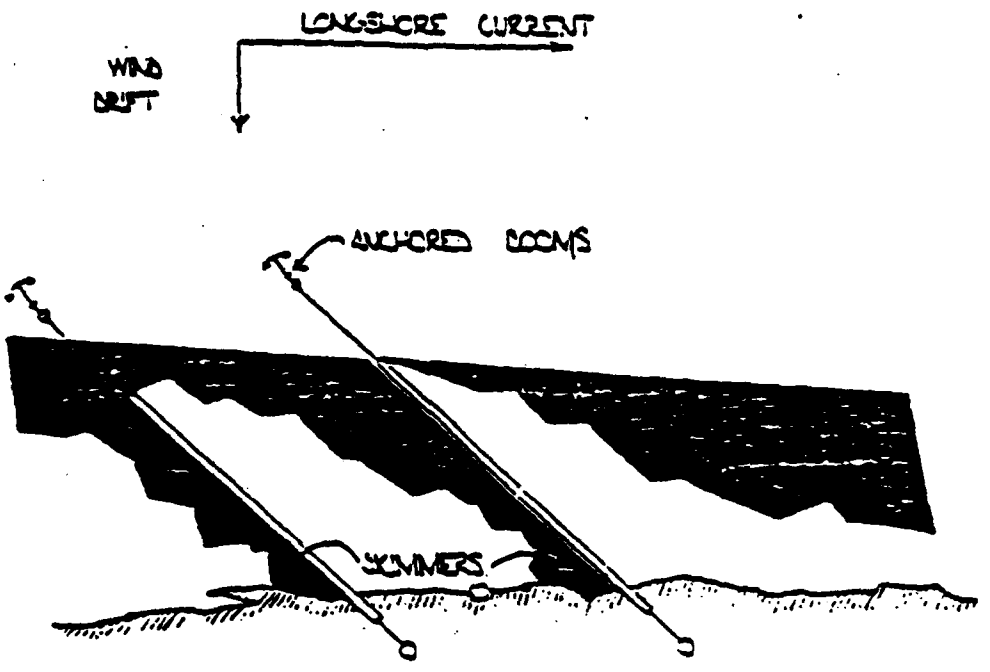


FIGURE V-13

Use of floating booms to protect shoreline when there is an appreciable longshore current.

(from National Park Service, Oil and Hazardous Substances Pollution Contingency Plan)

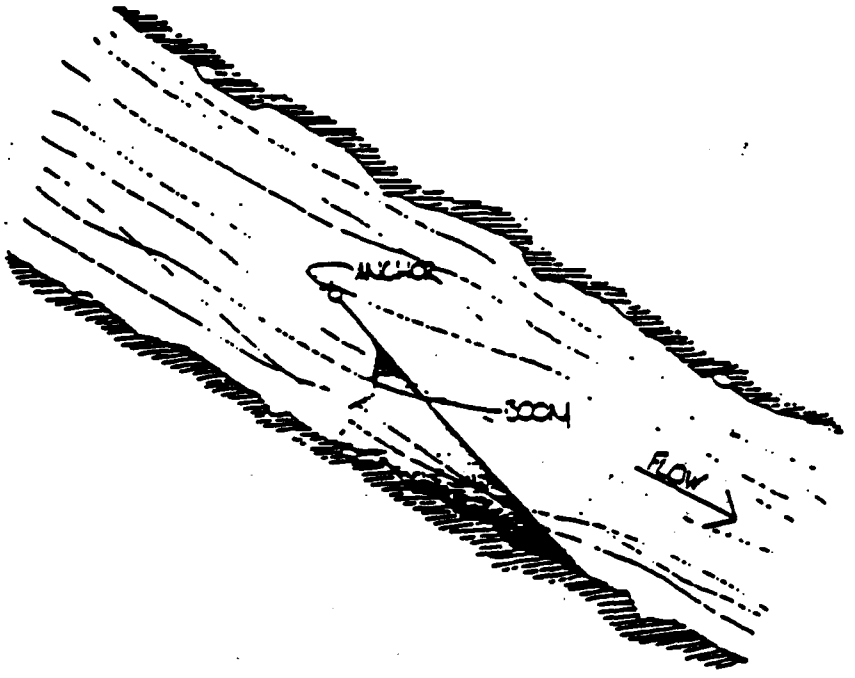


FIGURE V-8

Figure V-8 depicts a wide fast-flowing river where the boom will not reach across the river, again, since the current will wash the oil under the boom; a diversion configuration must be employed to divert the oil to a calm area where removal is possible. The boom is tied to the shoreline at one end and attached to a mooring line at the other end to maintain the proper configuration to herd the oil.

(from National Park Service, Oil and Hazardous Substances Pollution Contingency Plan)

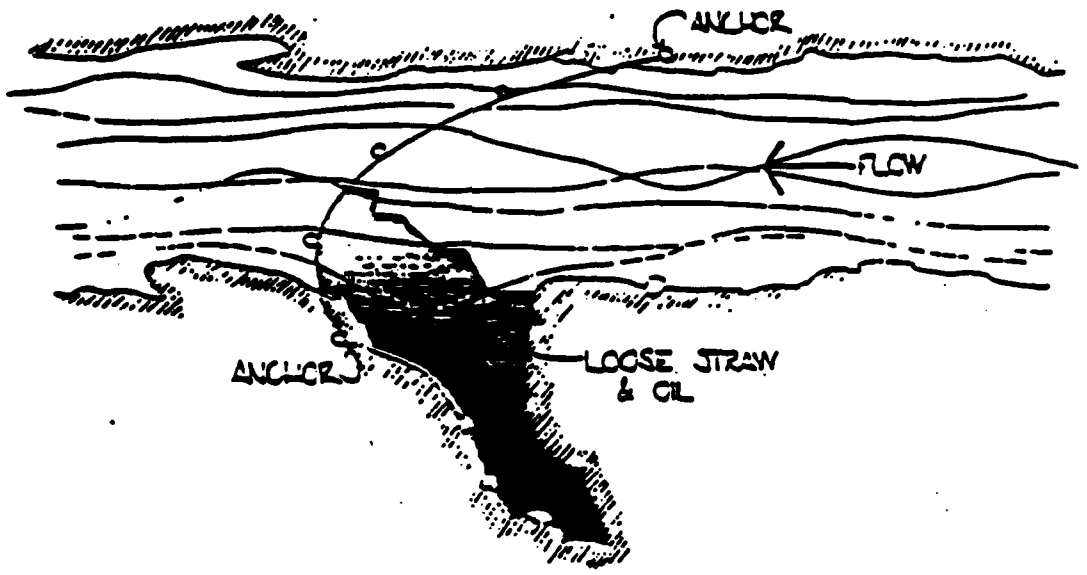


FIGURE V-10

In this situation, you are making use of a relatively quiet area to hold oil for cleanup. This method may require continuous addition of straw on the upstream edge of the boom as the natural flow will take oil and straw across the stream into the cove.

(from National Park Service, Oil and Hazardous Substances Pollution Contingency Plan)

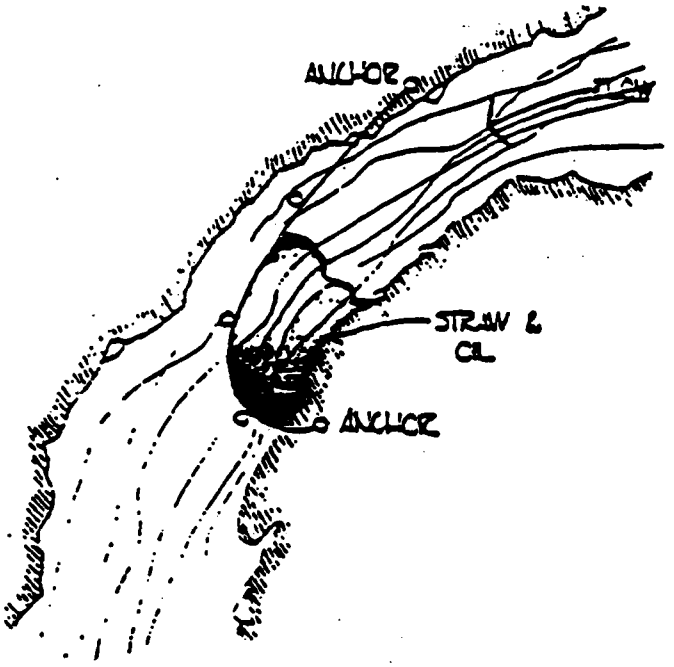


FIGURE V-16

The guide to success of a containment boom on a curve is to let the current work for you. The velocity will be less on the inside of the curve. Try to contain and direct the oil and straw to that point. Try to pick a spot before two streams merge and where cleanup can be effected without much difficulty.

(from National Park Service, Oil and Hazardous Substances Pollution Contingency Plan)

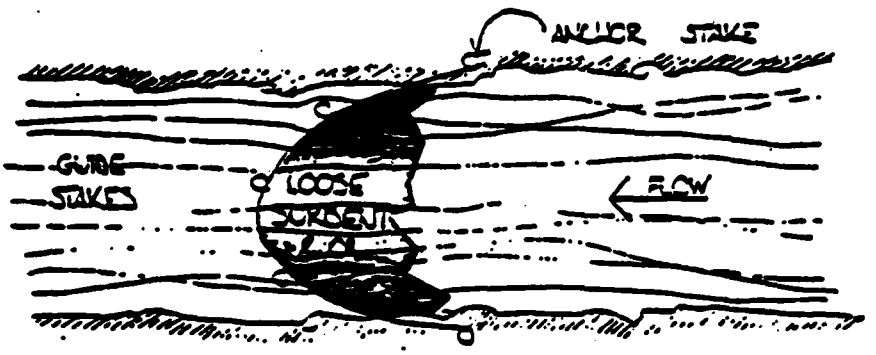


FIGURE V-9

Keep in mind:

1) Current must be slow
2) Site must be accessible
3) Cannot be used in navigable waters

(from National Park Service, Oil and Hazardous Substances Pollution Contingency Plan)

APPENDIX G

BIRD CLEANING AND HAZING TECHNIQUES (FWS)

(from USFWS Region 5 Contingency Plan for Response to Oil and Hazardous Substances, 1979)

CLEANING OF OILED BIRDS

Principles of Cleaning

1. Cleaning should be done when the birds are in the best possible physical condition
2. Rough handling will retard waterproofing
3. The cleaning agent must be appropriate and properly used
4. Feathers must be thoroughly cleaned and rinsed to be waterproof

The Cleaning Process

1. Tube the bird 9% Karo solution
2. Fill the basins with detergent solution to correct temperature and strength
3. Fill "Water-Pik" reservoir with detergent solution
4. Set "Water-Pik" pressure dial on low and, with the tip directly against the skin, clean the bird's head and neck
5. Begin cleaning in first basin
6. Force out excess cleaning agent
7. Continue to other basins until the solution is also clear
8. Rinse the bird
9. Dry the bird

Drying Process

1. Tube the birds 9% Karo solution
2. Apply ointment to the feet
3. Apply "Liquifilm" to the eyes
4. Place booties on the bird's feet
5. After the birds are dry, again tube with Karo solution

USE OF BALLOONS AS A BIRD SCARE DEVICE

Most waterfowl are wary of objects that not only move but are located at altitudes greater than theirs. Balloons blowing in the wind fit the need, are relatively economical, and are easily serviced. Balloons purchased should not be those that are extremely sensitive to ultra-violet rays, such as some weather ballons. They should, however, be large enough so they can be inflated to 20- to 30-inch diameters without undue stress. Gas used to inflate balloons can be either helium (expensive) or hydrogen (flammable). The latter should not be used near equipment or supplies which could cause an explosion. The balloons should not be inflated much beyond 2 feet in diameter because of the increased wind resistance which makes them more subject to wind loss or damage.

The balloons should be attached to a driven stake by 50 to 75 feet of 50 pound (OR STRONGER) monofilament line. Care should be taken in selecting the specific staking site since cornstalks, tree branches, and other sharp projections will puncture the balloons during high winds.

Initial spacing of balloons should be at least 200 yards. Fields edged with trees or dense fence rows may only need a few balloons through the center of the field.

Several balloon colors are available. White or yellow balloons may be more effective scare devices for night control of waterfowl.

Mylar ballons are preferred because they hold helium longer!

APPENDIX H

OIL CONTAINMENT AND RECOVERY IN ICE CONDITIONS

(from Sault Ste. Marie MSO Contingency Plan, 1986)

APPENDIX A to ANNEX VIII

1850 Extreme Cold Weather Cleanup Techniques

1851 General Considerations. Many of the oil spill response techniques, and much of the hardware developed for use in warmer climates can be used in combating oil spills in open water conditions in extreme cold. Modifications to open water systems must be made, however, in consideration of the low temperatures. It has been generally recognized that some response capability for oil spills on or under solid shorefast ice exists through in situ burning of the oil. This type of response is aided by the use of heavy construction equipment which greatly reduces manpower requirements, allows personnel to work out of the cold in an enclosed cab, and permits the handling of large masses of contaminated snow and ice. It appears that the most difficult spill situation occurs when oil is spilled in broken ice cover having concentrations greater than 40%. In this type of situation, the recovery of oil intermixed with large ice floes could be difficult and hazardous with present technology. It is generally agreed that conventional oil recovery devices may be used in light broken ice fields. However, their usefulness can still be limited by large ice pieces, high oil viscosity and low ambient temperatures.

1852. Containment. A wide variety of containment barriers are commercially available for use in open water conditions. The usual limitations in containing spilled oil in open water are winds, waves, and currents. For example, a water current velocity of about 0.6 kts normal to the boom is usually considered to be the upper limit for successful retention of oil by the boom. In the arctic, the usefulness of many booms is further limited by the additional environmental conditions of low temperature, stable ice cover, broken ice fields, moving ice floes, and snow. However, it has been judged that some commercial containment equipment and techniques can be applied to some limited extent in the arctic.

1852.1 Commercial Booms. Broken ice and cold temperatures present special oil containment problems. Some boom designs tend to operate more effectively than others under these conditions. Therefore, in evaluating booms for use in broken ice and cold temperatures, several boom construction features are desirable. These features include smooth sides, non inflatable buoyancy members in view of the possibility of ice puncture, tension members integral to the boom, strength suitable to withstand some ice loads, connectors easy to manipulate with gloves and additional reserve buoyancy because of the potential loss of boom flotation due to icing.

1852.2 Alternative

Oil Barriers for Arctic Use

a. Aside from these commercial containment booms, a review and evaluation of special containment techniques specifically intended for use in ice conditions was also completed. These devices and techniques are briefly discussed in the following paragraphs.

b. The ice-oil boom, which is a combination of a perforated ice boom and an oil containment boom, shows some promise for use in broken ice. The perforated boom is designed to pass oil through while not allowing passage of large ice pieces. The ice boom therefore deflects ice away from the oil containment boom. The oil containment boom then concentrates the oil and oil-coated small ice pieces which pass through the ice boom for recovery.

c. A device developed by Canadian Marine Drilling, Ltd. and Bennett Pollution Controls, Ltd. called the Arctic Boom, also offers some potential for use in broken ice conditions. The boom was designed to survive high tension loads. The smooth sides minimize ice snag, and the flotation members are protected from ice puncture. Field tests have been completed, but the results are not yet publically available.

d. Another boom developed by Bennett called the Deep Skerted Boom has potential application in solid shorefast ice conditions. This boom is installed through a slot cut in the shorefast ice. The 12 ft. deep containment skirt is capable of containing a considerable amount of oil providing there are no significant water currents present.

e. Trenching the ice also can serve as an effective containment technique. Trenches can divert the oil and concentrate it in the ice slot. This technique can also be used to expose oil that is spilled under the ice to the surface. This technique may be limited when temperatures are extremely low due to the refreezing of the slot.

f. An ice keel can also serve as an effective containment barrier for oil flowing underneath ice. Ice keels can be constructed by pumping water onto the ice surface. Ice keels can also be formed by removing the insulating cover of snow from the ice surface thereby causing more rapid ice growth.

1852.2 (Cont.)

g. Another concept is to create a containment pocket in the ice by insulating with snow or special insulating material. This technique will locally limit the ice growth and ecourage a pocket to form underneath the ice. Oil spreading underneath the ice will pool in this pocket.

h. Other alternatives for containment are net and bubble barriers which could be used to partially contain oil even in the presence of broken moving ice fields. These concepts are particularly useful during a continuous oil release such as in the case of a blowout. These concepts are being further investigated by the Canadian Environmental Protection Service.

1853 Recovery

1853.1 A discussion of oil spill recovery can be divided into two separate categories. The first involves the physical removal of the oil into a storage system. The primary means of accomplishment is the use of mechanical oil skimmers. The second category involves an in-place treatment of the slick to remove it from the surface and disperse it into the water column or atmosphere. This category includes in situ burnings, biodegradation, and the use of chemical treating agents. The use of these techniques also results in the disposal of the oil. The discussion of recovery techniques for cold region use is therefore divided into two sections, one each for mechanical recovery and non-mechanical recovery.

1853.2 Mechanical Recovery

a. A great variety of mechanical oil spill recovery devices have been developed for use on open water. There are several factors which limit the effectiveness of all devices in open water conditions. These limitations include the type of oil, waves, currents, and winds, debris, and physical restrictions, such as piers. For example, nearly all devices are generally ineffective in wave heights greater than 1.5 to 2.0 ft, or in currents greater than 0.6 to 0.9 knots. In the arctic, there are additional conditions which further restrict the effectiveness of these devices; these include cold temperatures and ice conditions. The cold temperatures can make the device inoperable due to icing, or cause failure of many seals and bearings. Cold temperatures can also greatly affect the viscosity of the spilled oil, with nearly all devices becoming ineffective when operated in highly viscous oil. Ice conditions ranging from light slush ice to large ice floes of varing concentration further limit the usefulness of many devices. Shorefast ice creates still another spill response situation.

1953.2(Cont.)

b. The available skimmers are categorized as weir, belt, disc, drum, and vortex devices. Most of the recovery devices currently on the market are of the weir type, in which oil floating on the surface of the water is separated by gravitational forces and passes over the weir which holds back the water. In the belt type, a flexible belt is drawn through the oil/water interface where the oil adheres to the belt and is subsequently squeezed from the belt into a collection sump. The disc type skimmer typically consists of a series of discs which rotate into the oil, and as the oil adheres to the disc, it is lifted up, wiped off, and collected in a storage unit. As a drum type skimmer rotates, oil coats the surface and is subsequently removed from the drum into a collection sump. The vortex type of skimmer is based on inducing a vortex floe which gathers and thickens the oil for removal.

c. Twenty-eight weir devices were evaluated and none were judged to be suitable in their unmodified form for use in the presence of broken ice. While none of the belt skimmers surveyed in the study offers a universal capability for recovering oil on, under, between, or sandwiched in ice, four units were judged to offer promise in limited applications. These four units are the Oil Mop, the Zero Relative Velocity Sorbent Belt, the FBF DIP, and the Bennett Oil Skimming System.

d. Of the disc units surveyed, Lockheed's Clean Sweep shows a great deal of promise for successful application in limited broken ice conditions due to its inherent ice processing ability. This ice processing ability is largely due to the rotating vanes which provide the means by which ice is swept underneath and past the recovery device while oil rises up into the collection area. Of the drum recovery devices evaluated, none appear to be suitable for use in ice conditions. The vortex devices were judged to have their suction areas quickly clogged with ice when operating in broken ice fields, and were therefore judged unsuitable for general use in cold regions.

e. In some applications, the direct mechanical recovery of spilled oil is augmented with the use of sorbents. These sorbents, which soak up and remove oil from the water surface, are useful in some instances. However, the major problem with the use of sorbents is the necessity for broadcasting and recovering the material. For arctic applications in the presence of broken ice cover, the recovery of sorbents would be very difficult and does not seem practical.

1953.3 Non-Mechanical Recovery

A. Non-mechanical recovery techniques are actions that are taken when mechanical recovery is not possible, or action that can be taken more quickly than mechanical recovery in order to minimize the impact of a spill on the environment. The methods of non-mechanical recovery discussed below include:

1. In situ burning
2. Biodegradation
3. Surface collecting agents
4. Dispersants
5. Sinkants.

1953.4 In Situ Burning

a. Because of the remoteness of potential Alaskan spill sites, it is likely that in situ burning would be more acceptable in the arctic than might be the case in more populated areas of the lower 48 states. The burning of oil on open water, in between broken ice, and on the surface of ice will likely serve as an important oil pollution countermeasure in the arctic.

b. In situ burning on open water depends on the way in which oil vaporizes and burns as a thin film on water. The combustion of fuel occurs in the vapor phase. The water acts as an infinite heat sink, taking heat away from the fuel. Analysis of burning pools of oil indicate that oil will burn at a rate of about 1.5 millimeters per minute from the surface of a spill. As the layer of burning fuel thins, the heat conducted away by the water begins to equal the heat backradiated by the flame. At this point, the rate of burning and the height of the flame both decrease. As the fuel layer becomes still thinner, a temperature is reached at which there is no longer enough fuel vaporization to maintain the flame in competition with heat loses to the water. When the liquid fuel reaches this temperature, known as the fire point, the flame goes out. Generally most crude oils burn out when the slick thickness on water falls below 5 millimeters. When special wicking agents are used, this thickness may be reduced to about 2 millimeters.

1953.4 (Cont.)

c. The operation of the wicking devices is dependent upon the capillary rise of oil through the wick, and upon the vaporization and combustion of the oil. Ideally, wicking agents should be hydrophobic, oleophillic, flame resistant, non-combustible, and contain channels of optimum capillary diameter for oil to move upward. Since large quantities of wicking agents are often required, these agents should also be inexpensive and easy to manufacture. In a study conducted by Environment Canada AMOP, six wicking materials were evaluated. In general, Nomex and interwoven polypropylene cord materials performed best in the tests. In the tests of these cord materials, the wick operated effectively for a maximum period of one hour. After this time, the flames spread over the entire slick completely destroying the wick material. Work is in progress to eliminate this problem. This study also considered ignition of the wicking material by a timing system, radio signals, and by an oil slick detection device. The timing system was considered as the most reliable and inexpensive method and a prototype was built and tested.

d. Providing the slick is thick enough to support combustion, which means at least 5 millimeters for crude, direct burning by air-deployable igniters is feasible. The igniter must supply sufficient energy to initiate and maintain local heating and volitization of oil near the igniter, local ignition of oil vapors near the igniter, and flame spread to the entire slick surface. To meet these requirements, five igniters were tested under the Environment Canada AMOP program. The igniters tested include Kontax, solid propellant, solid fuel, and sodium and gasoline igniters.

e. Kontax igniters were designed mainly for the purpose of oil slick combustion, and has been previously used in air deployment applications. Solid propellant igniters have the advantage of providing a strong flame which is not likely to be extinguished under windy conditions. Solid fuel igniters are inexpensive and have the advantage of not being rapidly consumed by flames. The sodium and gasoline igniters also have the advantage of being very inexpensive to manufacture. Solid fuel, solid propellant, and Kontax igniters were effective in oil slick ignition, having ignition probabilities of 94%, 99% and 100% respectively.

1953.4 (Cont.)

f. Delayed activation of air-deployable igniters can be achieved by using separate starters. These starters include chemical, electrical, and fuse wire starters. Field tests showed the most effective starter/igniter combination to be fuse wire starters used with solid fuel and solid propellant igniters. The probability of ignition for this combination was 80%. Problems encountered in air deployment of the igniter/starter combinations include damage by landing impact and splashing the oil away from the igniter when landing. Future research by Environment Canada is planned.

g. It also seems reasonable that oil in between ice floes could be burned provided the oil thickness is adequate. The broken ice could help contain the oil to a thickness great enough for effective combustion to take place. Special containment barriers could also be used to help contain the oil for burning. Some fire resistant commercial booms are presently being tested as part of the Environment Canada AMOP program.

h. Even in cold regions where the oil is partially contained by the ice, in situ burning is likely to be an effective spill countermeasure. Approximately 90% to 95% of a slick can be eliminated from the surface of the water or ice by using this method. Research is still required to address some of the problems associated with air deployable wicking agents, igniters and starters. These problems include safety in handling and transportation, reliability, chemical stability, and the splashing of oil on the igniter. Problems are also involved in obtaining permission to carry these devices in various classes of military and civilian aircraft. If a variety of devices are approved for use, there is also a problem of uniformity of air launchers, particiularly for multi-national use.

1953.5 Biodegradation

Microbial degradation of petroleum depends on the chemical composition of the spilled oil, the enzymatic capabilities of the microorganisms and the environmental conditions. In the arctic, microorganisms must be capable of degradation at low temperatures which in turn tends to limit the rates of their degradative activities. While little can be done to manipulate temperature, it should be noted that spilled oil may absorb solar radiation and raise the temperature around the spills, making it more favorable for microbial activities. Additionally, petroleum hydrocarbons can be degraded at low temperatures and the presence of ice crystals may actually stimulate this process; however, if the oil is isolated and preserved in ice, the biodegradation process fails to occur.

Crude oils from the arctic, such as Prudhow crude, contain heavy complex hydrocarbons which are difficult for microorganisms to attack, but on the other hand, such crudes also lack a volatile fraction which is toxic to microorganisms. Other factors influencing biodegradation, such as limitation on the useable forms of nitrogen and phosphorus, which is characteristic of marine ecosystems, may be overcome by appropriate addition of suitable fertilizer. The fertilizer formulation should be of a usable form which will not add appreciably to the high body of spilled oil. Also, limitation on the low numbers of oil degrading microorganisms may be overcome by seeding. The inoculum will have to be composed of a mixture of microorganisms that are capable of enzymatic activities at low temperatures and that are also capable of degrading the wide variety of hydrocarbon structures found in crude oil. Ideally, the microorganisms will convert these hydrocarbons to carbon dioxide. More research is required to investigate further the effectiveness of fertilizers and degradation rates of oil under various snow and ice interactions.

1953.6 Surface Collecting Agents

a. Surface collecting agents are chemicals that are applied along a spill boundary to prevent further spreading or to compress thin films into thicker ones. The basic requirement of these collecting agents is that their spreading pressure be greater than that of the spilled oil.

b. Annex 10 of the National Oil and Hazardous Substances Pollution Contingency Plan has recently been extended to approve certain chemical treating agents for use in combating spills. As of February 1979, the only surface collecting agent which had been approved is the Shell Oil Herder. The Oil Herder has been successfully applied at temperatures down to 25°F by keeping the solution agitated, however, the product normally solidifies at temperatures of 36°F and because of this, would not perform satisfactorily in most Alaskan environments.

1953.7 Dispersants

a. Since the grounding of the TORREY CANYON in March 1976, the use of dispersants has been severely criticized by many groups throughout the world. However, with the recent development of less toxic and more effective dispersants, their use has become more widely accepted. Dispersants are chemicals that are applied to an oil slick to create an oil-in-water emulsion. The resulting emulsion consists of tiny droplets of oil and dispersant which become distributed in the water column. The mixing of the spilled product limits spreading of the surface, increases the surface area of oil available for biodegadation, and limits some forms of environmental damage generally associated with surface slicks, such as damage to water fowl.

b. Several self-mixing dispersants have recently been developed. These agents use chemical diffusion rather than mechanical mixing to disperse the droplets into the water column. These self-mixing dispersants produce a smaller, more uniform oil droplet size when compared to dispersants which require mechanical mixing. More importantly, these dispersants do not require much external energy to disperse the oil into the water column.

1353.7 (Cont.)

c. The effectiveness of a dispersant is indirectly related to the slick thickness; that is, the thinner the slick, the more extensive the dispersion. Thicker oil often has a higher oil viscosity, which in turn is related to the air and water temperature. Therefore, the effectiveness of dispersants will be adversely affected by cold temperatures. A thick slick, or one having a high wax or asphalt content, requires the use of more dispersant. For example, one part dispersant is generally adequate to break ten parts of oil. For oils with high asphalt content or at very low temperatures, three or four times that amount of dispersant may be required.

d. There seems to be direct relationship between changes in viscosity due to temperature and percent dispersal in the range of 5 to 20*C (10). Taking 20*C and 100 percent dispersion as a basis, the decrease in temperature to 10*C caused a factor of two degrees in percent oil dispersed. Similarly, percent of dispersion dropped by a factor of three as the temperature dropped from 20*C to 5*C . Although these test results are preliminary, they do indicate that dispersants have reduced effectiveness at lower temperatures.

e. The Environment Canada AMOP sponsored a program investigating the application of dispersants in the Southern Beaufort Seal (1). This study found that regardless of the application method, it costs $444 to purchase and deliver 264 gallons of dispersant to a spill site or $1.68 per gallon delivered. To this must be added the cost of application, which for aircraft platforms would be in the neighborhood of $65 per 264 gallons or another $.25 per gallon. Therefore, the total cost to disperse 5.3 million gallons of oil would be more than 10 million dollars. These costs do not include ancillary equipment and manpower.

f. In addition to the influence of temperature on oil dispersant effectiveness and high costs of application, local environmental conditions affect the use of dispersants in the arctic regions. The effectiveness of dispersal depends on the volume of water in which the oil will disperse, which is in turn influenced by water depth, and water turbulance. Waters along many sections of the Alaskan coast are shallow providing a small volume of water for dispersion. In addition the effects of ice tend to dampen wave action which decreases the energy available for dispersion. In spite of these problems, dispersants may still be the most effective spill countermeasure available in some situations.

g. Dispersants used in the coastal waters of the United States must be approved by the Environmental Protection Agency.

1853.8 Sinkants

A variety of sinking agents have historically been employed to prevent oil from spreading or to remove the environmental hazard of oil slick on the water surface. Current federal regulations contained in Annex 10 of the National Oil and Hazardous Substances Pollution Contingency Plan prohibit the use of sinking agents.

1854 Transfer System Components

1854.1 The Prime Mover

This system element is the power source for the transfer system. The prime mover is generally a gasoline engine, diesel engine or gas turbine. In addition to the usual space, weight, and power requirements the prime mover in the arctic has problems in starting and operating in extremely cold temperatures.

In the cold weather tests of the Coast Guard ADAPTS system, the air cooled diesel prime mover was started at air temperature of -40*F, but some problems were involved. For example, it was necessary to spray ether directly into the air intake filter and crank the engine much longer than normal to achieve a successful start. Other problems also had to be solved: air cooling had to be reduced to get normal engine operating temperature; special lube oil was required; the engine oil temperature gauge did not operate at 140*F; synthetic rubber seals and gaskets leaked; engine V-belts cracked; seals leaked in the hydraulic drive unit for the systems submersible pump, and special hydraulic fluid was required. These problems were solved by identifying special seals and gaskets, special fan belts, and special fluids to use in the various systems. These kinds of problems may be expected in adapting any prime mover for use in the arctic.

As an alternative to starting the prime mover at extremely cold temperatures, it is common artic practice to enclose the engine in a heated shelter or to use a portable heater to bring the engine up to a higher temperature before attempting to start it. Once started, the diesel may be kept running as long as it is needed. Although this reduces the starting problem, many of the same precautions for cold weather starting still apply.

1954.1.A. The Pump

a. Although a great many different kinds of pumps are suitable for transfer systems in the lower latitudes, the requirements of low temperature operations generally limit those available to one or two choices. The special problems involve high viscosity of oil at low temperatures and the requirement to pass some ice and debris along with the recovered product. Thee pumps that may be considered for use in this system include diaphram, centrifugal, positive displacement or progressive cavity, and vertical turbine pumps. Air, steam, and hydraulic lift systems are generally not practical for these transfer systems because of the nature of the fluid to be moved and the way in which system components must be arranged.

b. Recent tests of centrifugal, positive displacement, and vertical turbine pumps clearly show the relative effectiveness of these devices in moving cold, highly viscous oils. Although five separate pumps were evaluated in these tests. the system tradeoffs can be illustrated by just showing results for each pump type.

c. The test used the heavy No. 6 bunker-C oil as a test fluid. Although this oil is much more viscous than crude oil, which may be about equivalent to No. 4 oil, crude oil may have a comparable viscosity in the arctic as a result of being pooled on ice in extremely low ambient temperatures. VIII-A-11-A shows the general range of oil viscosity according to the fuel number designation. The pumps selected to illustrate general system capabilities are the Prosser centrifugal pump, the Moyno progressive cavity pump, and the Byron-Jackson vertical turbine pump. VIII-A-11-B through 11-D show the results of these tests in terms of flow and pressure for various oil temperatures.

d. VIII-A-11-B shows that the centrifugal pump has a high flow capacity as long as the temperature of the fluid is relatively high byt as the temperature drops, the oil viscosity increases, the flow capacity also drops rapidly. VIII-A-11-C shows similar capability for the vertical turbine pump. VIII-A-11-D shows that the progressive cavity pump has a generally lower flow rate but the rate is not reduced nearly as much as a result of change in temperature. In this particular test the vertical turbine pump was found to be unsuitable for pumping highly viscous oil. Although this particular study found the centrifugal pump to be best for arctic use because it is effective for a wide range of oil viscosity and also has a high tolerance in pumping water, debris, and ice mixed with the oil. Also, in extremely cold weather, centrifugal and vertical turbine pumps have problems with impeller clearances and pump seals.

1854.1.A. (Cont.)

The progressive cavity pump has a helical steel rotor inside a helical synthetic rubber stator. The soft stator gives it capability to pass fairly large solids and it does not have the cold weather problems of clearances typical of the all - metal pumps.

1854.1.B. (The Hose) A normal pump discharge hose, such as the one used in the ADAPTS system, is generally only suitable down to 0°F and may be brittle and crack at temperatures of -40°F. This hose therefore must be replaced with special low temperature hose plus low temperature seals. Although the product mixture may be considered to be at 28°F, the oil/water/ice mixture may still freeze and clog the hose if there is a considerable distance between the pump and storage container or if the hose rests on cold shorefast ice. To prevent clogging by freezing it may be necessary to insulate the hose or even heat it.

1854.1.C. (The Oil) Oil is basically the fluid to be transferred however the oil may generally be expected to be mixed with sea water, debris, and ice. Large pieces of debris and ice must, of course, be rejected at the pump suction, but it is desirable and even necessary for a pump used in the arctic to pass small pieces of ice. In a recent test several progressive cavity pumps were successful in passing pieces of ice with a 3/4" diameter. One double acting diaphram pump, specially designed to handle water/oil/solid mixtures in oil operations, is expected to pass solids with a 3" diameter. The results of the test of the diaphram pump are not available at this writing.

a. Transferring high viscosity oil is another problem that occurs during arctic cleanup operations. This problem is generally solved by using a pump suitable for transferring high viscosity fluids. In some cases, however, it may be desirable to attempt to reduce the viscosity of the oil. This can be accomplished by a number of methods.

b. First, a stirring propeller located ahead of the pump intake can reduce the apparent viscosity of the oil. This procedure is effective in inproving the performance of a positive displacement pump used with very thick oils.

c. Oil viscosity can also be reduced by heating. This can be accomplished by the use of portable steam heating coils, electric heating coils, or even hot oil-spray heating. In most cases, arctic oil recovery devices are mounted on small craft or employed at remote installations that are not likely to have access to steam. Electric heating of a recovery pump may be possible providing the power requirements are not high.

1954.1.C. (Cont.)

d. The viscosity of the collected product can also be reduced by diluting it with less viscous soluable fluid. This may be possible in some cases however it involves a logistics problem in obtaining the solvent and increasing the storage volume requirement of the recovered product.

1954.2 Summary

A considerable amount of development and testing has been done to produce an effective arctic transfer system. Progress has been made to adapt and change system components so that they function in the cold arctic temperatures. Several tests have been conducted with pumps transferring highly viscous oil but there is less experience pumping the typical arctic oil/water/ice mixture.

Generally the progressive cavity or positive displacement pumps are favored for this purpose, however even these are only capable of passing relatively small pieces of ice. A double acting hydraulically driven diaphram pump specifically designed for the oil/water/ice mixture has been developed and is being tested in Canada, however the results of these tests are not known as of this writing. While much progress has been made on arctic transfer system components, a prototype system has not been developed. Development of a complete arctic transfer system remains a high priority R&D project.

1955 Storage

a. Some form of temporary storage is often required when responding to an oil spill. The primary function of storage is usually as a buffer between mechanical recovery and disposal. In addition, smaller containers may be useful in ferrying oil from the skimmer to a tanker or a holding unit with a larger capacity. Means of storage include:

Natural Onshore or Ice Features - such as lakes, coves, or shorefast ice

Portable Floating Containers - both static and towable

Marine Vessels - such as ships and barges

Collapsible Land Based Storage - including pillow tanks

Other Land Based Storage - such as tank trucks and oil drums.

1955 (Cont.)

b. Natural ice features may be used as short term storage. Oil could be pumped onto ice where it could be held by natural ice barriers or manmade barriers. Such barriers could be constructed by building a beam on shorefast ice and spraying it with water to form an ice lining. The use of shore features such as bays, beaches, or coves is likely only when there are no other near-term solutions. The use of natural onshore features such as natural reservoirs is only justified if the potential ecological threat of an uncontrolled spill far outweighs the local damage from the use of this storage technique.

c. Portable floating containers offer an excellent means of storage if the recovered oil is free of debris. Some of the floating containers which are towable are also air deployable, such as the type manufactured by Dunlop. The French Caiman is another towable container, but it has permanently pressurized floating tanks which make it non-air deployable. Another storage device called a donut, is a modified version of the U.S. Navy oil disposal raft.

d. Icebreaking tankers, which are presently being developed, could potentially be employed in the future for large volume aquatic oil spills in ice infested waters. Tank barges may also be useful in storing oil under certain conditions. Barges and ships have the added advantage of being useful as work platforms and can sometimes offer the additional capability of separating recovered oil and water.

e. Pillow tanks or water bags can be used for temporary storage. They have the advantage of being easily transportable and are commercially available. They can be placed on tugs and ships, or can be placed on large ice floes or shorefast ice. In addition, a pillow tank can be used on land and in a permafrost area since it has the ability to shift as the ground beneath thaws. Table B-13 is a list of representative commercial pillow tanks. Open topped containers listed in Table B-14 can be used on a stable platform. Portable swimming pools can also be used as temporary storage, providing an economical and easily transportable means of storage in remote areas.

f. Land - based tank trucks can also provide storage capacity. Tank trucks commonly used to transport petroleum products typically have a capacity of 1,000 to 6,500 gallons. Vacuum trucks typically have holding capacities varying from 1,000 to 4,5000 gallons. Skid-mounted rigid wall tanks and oil drums could also be used as closed or open top containers. Permanent storage tanks located on shore could be used for holding the oil if a means of moving the oil to the tanks can be provided.

1856 Disposal

Disposal of recovered oil can take place by either salvage or by incineration. Salvage is defined as the reuse of recovered oil. Incineration refers to the disposal of the oil by burning with mechanical means. This does not include in situ burning which was discussed under recovery.

1856.1 Salvage

a. One method of salvaging the oil would be to deliver the recovered product to a local refinery. However, the practicality of this method often limits its use. The logistics problems and the required additional oil processing make this alternative uneconomical most of the time.

b. The use of existing pipelines could provide another means of salvage. The recovered product, provided it is not considerably contaminated, could possibly be pumped into a pipeline. This would be feasible if a large volume of oil is being transported through this pipeline, and if the recovered oil is injected into the pipeline in small amounts. There may be little effect on the quality of the oil at the pipeline terminal.

c. Reinjection of the recovered oil into a well is another attractive alternative.

1856.2 Incineration

a. Incineration, as opposed to in situ burning, involves some kind of recovery activity before, disposal. The recovered oil is disposed of by some type of mechanical burning device. These devices include open flame burners, open pit burners and rotary kilns. All of these devices have the advantage of being transportable to the spill site, and could be used to burn the oil in an area adjacent to the storage containers.

b. The open flame burners have the potential for disposing of approximately 250 gal/min of oil at the spill site. These devices can presently be disassembled and transported in a C-130 aircraft. However, development is required to make them transportable by helicopter on pallets so they could be readily used on scene. The open flame burners can accept a product that contains small bits of rock, sand and debris, however, the limitation of the debris size has not been established. These devices can also handle a considerable amount of water mixed with the oil and still maintain a clean burn. The open flame burners may have problems in disposing of oil of high viscosity.

1956.2 (Cont.)

c. Rotary kiln burners can be used to burn oil mixed with nearly any kind of waste. The Environgenics Rotary Kiln Burner was designed to clean oil from beach sand and debris and could clean 20,000 lbs. of sand per hour containing 500 lbs. of oil. Although designed for mixtures of oil and sand, it appears that with slight modification it could be used for a mixture of oil, snow, ice and other debris.

d. Open pit burners can be used to dispose of large quantities of oil and oiled debris. A unit weighing between 20 to 30 tons could dispose of up to 1 ton per hour of oiled debris. These devices have the advantage of easy fuel handling, no requirements for skilled labor, low maintenance, and a low investment. There are presently no air transportable units available; however, the problem is under study by the Canadian Environmental Protection Service. Although the disposal rate of open pit burners is not as great as that of open flame burners, they could be effective in the arctic in disposing of high viscosity oil and debris.

APPENDIX I

EQUIPMENT CONTRACTORS

1. 50 CONFIRMED DURING THIS STUDY.
2. DETAILED LISTING OF SERVICES (34 GROUPS).
3. LICENSED HAULERS OF LIQUID INDUSTRIAL AND HAZARDOUS WASTE.

Directory of spill-related companies able to respond to spills of oil and hazardous substances within the upper Great Lakes region. The Canadian Coast Guard is also listed as it has equipment available under the Joint Canada-United States Contingency Plan. An asterisk (*) denotes that a full description of the contractor's equipment is included in this appendix.

* A & B Industrial Services
5070 W. Michigan Ave.
Kalamazoo, MI 49007
800-632-4176
616-375-9595

* Ace Oil Service Inc.
876 Otter Creek
Oregon, Ohio 433616
419-726-1521

* Alchem-Tron, Inc.
Environmental Pollution Serv.
7415 Bessemer Ave.
Cleveland, OH 44127
216-441-5628

Amoco Oil Co.
2230 N. 20th Ave.
P.O. Box 418
Escanaba, MI
906-786-5542
906-786-3294

* AMO Pollution Services.
RD #2, Box 311b
Canonsburg, PA 15317
412-921-8486

A-1 Disposal Corp.
400 Broad St.
Box 301
Plainwell, MI 49080
616-685-9801

* Associated Chemical and Environmental Services
876 Otter Creek Rd.
Box 7571
Oregon, OH 43616
419-726-1521

Bay De Noc Oil Spill Co-operative
Escanaba, MI
906-789-2282/5882

* Bay West
800 N. Grotto St.
St. Paul, MN 55104
517 So. 59th St.
Duluth, MN
612-488-1008
218-628-1093

* Canadian Coast Guard
Amherstburg, Ontario
519-736-5449

* C&K Industrial Services, Inc.
5617 Schaaf Road
Cleveland, OH 44131
216-642-0055

* CECOS Environmental, Inc.
4879 Spring Grove Ave.
Cincinnati, OH 45232
513-681-5738

* Commercial Oil Service Inc.
3600 Cedar Pt. Rd.
Oregon, Ohio 43616
419-729-3763

* Egeler Industrial Waste
9246 Cedar Run Rd.
Traverse City, MI 49684
616-946-6801

* EnManCo Corp.
Box 239
Utica, MI 48087
313-731-3130

* Environmental Control Services
5339 Clay St. S.W.
Wyoming, MI 49508
616-532-5767

Environmental Management Control
1141 County Rd. #51
Genoa, OH 43430
419-855-8378

* Environmental Pollution Control
36700 South Huron Rd.
New Boston, MI 48164

Erieway Pollution Control
Knich Rd. Industrial Parkway
33 Industry Drive
Bedford, OH 44146
216-439-2955

* Ever Clean Inc.
1478 W. Grand River
Okemos, MI 48864
517-349-2311

Great Lakes Environmental Services
22077 Mound Rd.
Warren, MI 48091
313-758-0400

* Harmeyer Construction
RFD 1
Genoa, Ohio 43430
419-855-8378

Inland Waters Pollution Control
24354 King Rd.
Romulus, MI 48174
313-479-0440

* IT Corp.
11270 West Park Place
Suite 700
Milwaukee, WI 53224
414-359-2222

* Jabe Construction and Equipment
2501 Manchester Rd.
Erie, PA
814-838-4593

JAVCO
2050 Shawano
Green Bay, WI 54301
414-893-0714

* Ken Gill Construction
2124 Sand Rd.
Pt. Clinton, Ohio 43452
419-732-3488

* Lakehead Pipeline Co.
340 Elm Street
Manistique, MI 49854
906-341-2193/2845/2776/2362

* L.S. Snyder and Sons, Inc.
4811 Muggy
Port Clinton, OH 43458
419-797-2286

MAECORP
17450 S. Halsted
Homewood, IL 60430
312-957-7600

* Marine Pollution Control
8631 West Jefferson Ave.
Detroit, MI 48209
313-849-2333

* McCullough Construction Inc.
2435 Gill Rd.
Port Clinton, Ohio 43452
419-734-5533

* Moravy Trucking
1934 Commercial Dr.
Box 530
Mt. Pleasant, MI 48858
517-773-6971

* M. Petty & Sons
653 Millard Ave.
Oregon, OH 43616
419-797-2286

* National Industrial Maintenance
4530 Baring Ave.
East Chicago, IN 46312
800-551-2218

Norris Contractin
1517 West 8th Sve.
Sau Ste. Marie, MI 49783
906-632-8264

OH Materials Co.
Box 427
Hopkins, MN 55343
612-935-4804

* OH Materials Co.
16406 US Route 224 East
Box 551
Findlay, OH 45839
419-423-3526

Peninsula Sanitation Inc.
Box 432
Marquette, MI
906-228-2028

* Peoria Disposal Company
4700 N. Stirling Ave.
Peoria, IL 61615
309-674-4238

* Petrochem Services Inc.
Box 337
Lemont, IL 60439
312-739-1150

Research Oil Co.
2655 Transport Rd.
Cleveland, OH 44113
216-621-8656

* Samsel Services Co.
1948 Carter Rd.
Cleveland, OH 44113
216-861-3949

* Site Planning and Development
Old US 31 South
Charlevoix, MI 49720
616-547-4064/3

Spill Recovery of Indiana
Box 34337
Indianapolis, IN 46234
317-291-3972

* Stenberg Bros. Inc.
Box 127
Bark River, MI 49807
906-466-9908
800-624-6086

* Stony Acres
2096 NW Catawba Rd.
Port Clinton, Ohio 43452
419-797-4533

US Steel 1
Cedarville, MI
906-484-2201

US Steel 2
1031 E. Portage
Sault Ste. Marie, MI
906-632-6311

* Valley Systems, Co.
Box 603
Canal Fulton, OH 44614
216-854-4526

A&B INDUSTRIAL SERVICES, Inc.

STEVE NEWELL
Sales Representative

Equipment	Quantity	Straight Time Rate	Time and a Half	Double Time	Mobilization Demobilization Charge (lump sum)	All rates are with 1 man unless otherwise noted
Vactor 1200	3	85.00	88.00	91.00	200.00	
Vactor 2045	1	78.00	81.00	84.00	200.00	
Truck Jet	1	65.00	68.00	71.00	200.00	
Trailer Jet	1	50.00	53.00	56.00	150.00	
Waterblasters NLB, 8150, 1012, 812	3	80.00	86.00	92.00	200.00	With 2 Men
4,000 Gallon Vacuum	1	70.00	73.00	76.00	200.00	
5,500 Gallon Vacuum	1	75.00	78.00	81.00	200.00	With Tractor
6,000 Gallon Stainless Vacuum	1	80.00	83.00	86.00	200.00	With Tractor
1,500 Gallon Vacuum	1	68.00	71.00	74.00	150.00	
3,000 Gallon Vacuum	1	70.00	73.00	76.00	200.00	
9,500 Gallon Bulk	1	65.00	68.00	71.00	200.00	With Tractor
6,500 Gallon Bulk	1	65.00	68.00	71.00	200.00	With Tractor
5,000 Gallon Bulk	1	65.00	68.00	71.00	200.00	With Tractor
Roll-off Trailers with tractors and straight trucks	4	70.00	73.00	76.00	200.00	
Roll-off Boxes	30	25.00 per week per box -			12 - 30 Yard	
Closed Circuit Television Inspection Unit	1	100.00	106.00	112.00	200.00	With 2 Men
Lead Trailers	2	67.00	70.00	73.00	200.00	30 Yd. Capacity With Tractor
Gravel Trains	2 Sets	75.00	78.00	81.00	200.00	45 Yd. Capacity With Tractor
End Loader (3 Yard)	2	68.00	71.00	74.00	200.00	
Backhoe (Case 550-C)	1	46.00	49.00	52.00	150.00	
Bobcat	1	34.00	37.00	40.00	100.00	
10 Yd. Dump Truck	2	44.00	47.00	50.00	100.00	
Dozer (JD 450)	1	46.00	49.00	52.00	200.00	
Hydraulic Excavator 2 Yd. Machine	1	100.00	103.00	106.00	400.00	
Van Body (80 Drums)	2	65.00	68.00	71.00	200.00	
Bucket Machines	2 Sets	65.00	68.00	71.00	200.00	With 2 Men
1-½" Trash Pump	1	5.00	5.00	5.00	-	Does Not Include Man
3" Trash Pump	2	10.00	10.00	10.00	-	Does Not Include Man
4" Trash Pump	3	10.00	10.00	10.00	-	Does Not Include Man

Equipment	Quantity	Straight Time Rate	Time and a Half	Double Time	Mobilization Demobilization Charge (lump sum)	All rates are with 1 man unless otherwise note
6" Trash Pump	1	40.00	40.00	40.00	200.00	Does Not Include Man
Spill Response Trailer	$1,500.00 per day	- 1 Day	Minimum		400.00	
Labor	40	25.00	28.00	31.00	100.00	
Supervisor	4	35.00	38.00	41.00	100.00	
Support Vehicles (Pick-ups)	6	5.00	5.00	5.00	75.00	
*Street Sweeper	3	105.00	110.00	115.00		
Consultants	3	50.00	60.00	70.00	100.00	

OTHER CHARGES

Costs associated with personnel protection levels

Level C	12.50 per hour (Respirators, Tyveks, Etc.)
Level B	25.00 per hour (SCBA, Urethane, Tyvek, Etc.)
Level A	Case by Case (SCBA, Moonsuits)

Drums

17-H Open Tops (55 Gallon)	$17.50 per drum
Salvage Drums (85 Gallon)	$150.00 per drum
65 Gallon Over Drum	$70.00 per drum

*Available through Sub-contractor

Ace Oil Service Inc
876 Otter Creek
Oregon, Ohio 43616
Contact - ~~Dennis Siefke~~ Lanny Nelson
Phone Day - 419-726-1521 Night 419-726-1521

River ~~Harbor~~ Boom
Boom 4 x 4 Slick Bar 100'per unit ID Number 00076
Number of Units 6 Unit Length 100 feet
Boom Draft 4 inches Total length 600 feet
Free Board 4 inches
Current Limit - Less than 0-5 knots
Sea State Limit - Less than 1 ft
Other Cahracteristics
Auxilary Equipment

Boom 4 x 4 Slick Bar 50' per unit ID Number 00077
Number of Units 6 Unit Length 50 feet
Boom Draft 4 inches Total Length 300 feet
Free Board 4 inches
Current Limit Less than 0-5 Knots
Sea State Limit - Less than 1 ft
Other Characteristics
Auxilary Equipment

Boom 6 x 6 Slick Bar 100' per unit ID Number 0079
Number of Units 12 Unit Length 100 feet
Boom Draft 6 inches Total Length 1200 feet
Free Board 6 inches
Current Limit - between 0.6-1.0 knots
Sea State Limit - Between 1-3 ft
Other Characteristics
Auxilary Equipment

Boom 6 x 6 Slick Bar 200' per unit ID Number 00078
Number of Units 1 Unit Length 200 feet
Boom Draft 6 inches Total Length 200 feet
Free Board 6 inches
Current Limit - Between 0.6-1.0 knots
Sea State Limit - between 1-3 ft
Other Characteristics
Auxilary Equipment

Manta Ray ID Number 00023
Number of Units 4 Unit Length feet
Boom Draft inches Total Length feet
Free Board inches
Current Limit - between 0.6-1.0 knots
Sea State Limit - between 1-3 ft
Other Characteristics
Auxilary Equipment

SORBENT

3M Type 100 Rolls
Number of Units 20
Total Weight 800 lbs
Form Rolls

ID Number 00014
Unit Weight 40 lbs
Sorbent Type - Synthetic
Application Ratio 1.025

3M Type 126 Sweeps
Number of Units - 50
Total Weight 850 lbs
Form - Bales

ID Number 00015
Unit Weight 17 lbs
Sorbent Type - Synthetic
Application Ratio 1.025

3M Type 151 Sheets
Number of Units 50
Total Weight 1000 lbs
Form Sheets

ID Number 00016
Unit Weight 20 lbs
Sorbent Type Synthetic
Application Ratio 1.025

3M type 156 sheets
Number of Units 50
Total Weight 1000 lbs
Form Sheets

ID Number 00017
Unit Weight 20 lbs
Sorbent Type Synthetic
Application Ratio 1.025

3M Type 157 Sheets
Number of Units 50
Total Weight 4000 lbs
Form Sheets

ID Number 00018
Unit Weight 80 lbs
Sorbent Type Synthetic
Application Ratio 1.025

3M Type 210 Particulate
Number of Units 50
Total Weight 1250 lbs
Form - Bag

ID Number 00019
Unit Weight 25 lbs
Sorbent Type Synthetic
Application Ratio 1.025

3M Type 240 Pillows
Number of Units 50
Total Weight 1250 lbs
Form - Bales

ID Number 00020
Unit Weight 25 lbs
Sorbent Type Synthetic
Application Ratio 1.025

3M Type 270 Sorbent Boom
Number of Units 50
Total Weight 2350 lbs
Form - other

ID Number 00021
Unit Weight 47 lbs
Sorbent Type Synthetic
Application Ratio 1.025

PUMP

Skid Vacuum Pump 40 bbls
Number of Units 1
Pumping capacity 150 GPM
Pump Storage gals
Hose Fittings 5.00 in
Pumping Head feet
Hose Size 5.00 in

ID Number 00022
Unit Weight lbs
Total Weight lbs
Prime Mover -Gasoline
Number of Hoses
Explosion Proof - yes
Hose Length

VACUUM/PUMPER TRUCK

Skid Back 80 bbls
Number of Units 1
Pumping Capacity GPM

ID Number 00026
Storage Capacity 3360 gals

Vacuum Truck 40 bbls
Number of Units 5
Pumping Capacity GPM

ID Number 00027
Storage Capacity 1680 Gal

Vacuum Truck 80 bbls
Number of Units 2
Pumping Capaicty GPM

ID Number 00025
Storage Capacity 3360 gals

BEACH CLEAN-UP EQUIPMENT

Backhoes
Number of Units 5
Comments

ID Number 00033

Crane 100 Tons on Tracks
Number of Units 1
Comments

ID Number 00051

Crane 44 tons on Tracks
Number of Units 1
Comments

ID Number 00055

Crane 65 Tons on Tires
Number of Units 1
Comments

ID Number 00053

Crane 70 Tons on Tires
Number of Units 1
Comments

ID Number 00054

Crane 90 Tons on Tires
Number of Units 4
Comments

ID Number 00052

Cranes,Pickers 7.5-50 tons on tires
Number of Units 15
Comments

ID Number 00056

Dozer Cat Compacter
Number of Units 1
Comments

ID Number 00049

Dozer D-6-B
Number of Units 1
Comments

ID Number 00044

BEACH CLEAN-UP EQUIPMENT cont

Dozer D-6-C — ID Number 00046
Number of Units
Comments

Dozer D-6-D Wide Track — ID Number 00045
Number of Units 1
Comments

Dozer D-8 — ID Number 00043
Number of Units 1
Comments

Dozer D-9 — ID Number 00042
Number of Units 2
Comments

Dozer T-D-8 — ID Number 00047
Number of Units 2
Comments

Dozer 350 Wide Track — ID Number 00048
Number of Units 1
Comments

Drott — ID Number 00037
Number of Units 1
Comments - Rubber Tires

Dump Truck 8 yd — ID Number 00040
Number of Units 3
Comments - Single Axle 8 yards

Dump Truck,Semi 20 yd — ID Number 00039
Number of Units 2
Comments 20 yards

Dump Truck, Tandem 16 yd — ID Number 00038
Number of Units 7
Comments 16 yard

Earthmovers — ID Number 00041
Number of Units 2
Comments Earthmovers

Endloader Model 988 — ID Number 00029
Number of Units 1
Comments - rubber Tire Endloader

BEACH CLEAN-UP EQUIPMENT (cont)

ENDLOADER, CATERPILLER — ID Number 00034
Number of Units 4
Comments - Endloader on tracks

Grade All — ID Number 00035
Number of Units 1
Comments

Graders — ID Number 00028
Number of Units 4
Comments - Can Get More If Needed

Pull Pans — ID Number 00050
Number of Units 2
Comments

Rubber Tire Endloader Model 922 — ID Number 00032
Number of Units 2
Comments

Rubber Tire Endloader Model 950 — ID Number 00031
Number of Units 2
Comments

Rubber Tire Endloader Model 966 — ID Number 00030
Number of Units 1
Comments

Shield Bantam — ID Number 00036
Number of Units 1
Comments - Very Big Backhoe

BARGE

Barge — ID Number 00057
Number of Units — Pumping Capacity GPM
Draft Loaded Feet — Draft Unloaded feet
Storage Capacity
Auxiliary Equipment - Various Sizes Available

BOAT

Boat 14 ft — ID Number 00060
Number of Units 7 — Length 14 feet
Draft Ft — Horsepower 0007
Propulsion Outboard

BOAT (cont)

Boat, Boston Whaler 16 ft — ID Number 00058
Number of Units 1 — Length 16 feet
Draft Ft — Horsepower 0075
Propulsion - Outboard

COMMUNICATIONS EQUIPMENT

Mobile Units — ID Number 00065
Number of Units 80 — Frequency/Channel 151.655MHZ
Equip type VHF — Power Source DC
Range 30 — Radio Call Sign KCR994

Pagers — ID Number 00063
Number of Units 25 — Frequency/Channel
Equip Type VHF — Power Source -Battery Pack
Range — Radio Call Sign

Portable — ID Number 00061
Number of Units 30 — Frequency/Channel 151.655MHZ
Equip Type VHF — Power Source - Battery Pack
Range 5 — Radio Call Sign KCR 994

Radio Telephone — ID Number 00064
Number of Units 8 — Frequency/Channel
Equip Type VHF — Power Source DC
Range — Radio Call Sign JP52236 057

Radio Motorola — ID Number 00062
Number of Units 4 — Frequency/Channel 151.655MHZ
Equip Type VHF — Power Source AC
Range 30 — Radio Call Sign KCR 944

SAFETY EQUIPMENT

Hazardous Material Suites — ID Number 00067
Number of Units 4
Comments

Scott Breathing Units — ID Number 00068
Number of Units 4
Comments 4 Spare Air Tanks

GENERATOR

Generator, Caterpiller — ID Number 00072
Number of Units 1 — Power Output 750 Kilowatts
Number of Outlets — Available Cable Ft
Explosion Proof Lights — Watts
Power Requirements - Diesel

COMMERCIAL OIL SERVICE INC
3600 Cedar Pt Rd
Oregon, Ohio 43616
Contact Ken Mikolas
Phone Day= 419-729-3763 Nite 419-836-3694

VACUUM/PUMPER TRUCK

Vacuum Truck 1700 gal ID Number 00153
Number of Units 1 Storage Capacity 1700 gals
Pumping Capacity GPM

Vacuum Truck 2000 gal ID Number 00152
Number of Units 1 Storage Capacity 2000 gals
Pumping Capacity GPM

Vacuum Truck 2100 gal ID Number 00151
Number of Units 1 Storage Capacity 2100 gals

BEACH CLEAN-UP EQUIPMENT

Backhoe ID Number 00154
Number of Units 1
Comments Medium Size

RIVER/HARBOR BOOM

Boom Slickbar 6 x 8 100' per unit ID Number 00142
Number of Units 2 Unit Length 100 feet
Boom Draft 8 inches Total Length 200 feet
Free Board 6 inches
Current Limit Between 1.1-1.5 knots
Sea State Limit - Between 1-3 ft
Other Characteristics
Auxilary Equipment

Boom Slickbar 6 x 8 50' per unit ID Number 00143
Number of Units 3 Unit Length 50 feet
Boom Draft 8 inches Total Length 150 feet
Free Board 6 inches
Current Limit - Between 1.1-1.5 knots
Sea State Limit - Between 1-3 ft
Other Characteristics
Auxilary Equipment

SORBENT

Conweb 18 x 18 Sorbent Pads ID Number 00145
Number of Units 500 Unit Weight lbs
Total Weight lbs Sorbent Type Vegetable
Form - Sheets Application Ratio

COMMERCIAL - cont

SORBENT

Straw — ID Number 00146
Number of Units 10 — Unit Weight 40 lbs
Total Weight 400 lbs — Sorbent type Vegetable
Form - Bales — Application Ratio

3M type 270 Sorbent Boom — ID Number 00144
Number of Units 10 — Unit Weight 10 lbs
Total Weight 100 lbs — Sorbent Type Synthetic
Form - Sheets — Application Ratio

TRANSFER/LIGHTERING SYSTEM

Tank Truck 1650 Gal — ID Number 00149
Number of Units 1 — Unit Weight 10000 lbs
Pumping Capacity 150 GPM Total Weight 10000 lbs
Pump Storage 1650 Gals — Prime Mover - Gasoline
Hose Fittings 2.00 in — Number of Hoses 2
Pumping Head feet — Explosion Proof Yes
Hose Size 2.00 in — Hose Length 30

Tank Truck 2250 Gal — ID Number 00148
Number of Units 1 — Unit Weight 11500 lbs
Pumping Capacity 150 GPM Total Weight 11500 lbs
Pump Storage 2250 Gals — Prime Mover - Gasoline
Hose Fittings 2.00 in — Number of Hoses 2
Pumping Head feet — Explosion Proof Yes
Hose Size 2.00 in — Hose Length 30

Tank Truck 2500 Gal — ID Number 00147
Number of Units 1 — Unit Weight 13000 lbs
Pumping Capacity 150 GPM Total Weight 13000 lbs
Pump Storage 2500 Gals — Prime Mover Gasoline
Hose Fittings 2.00 In. — Number of Hoses
Pumping Head feet — Explosion Proof Yes
Hose Size 2.00 in — Hose Length 30

Tractor Trailer 7300 Gal — ID Number 00150
Number of Units 1 — Unit Weight 28000 lbs
Pumping Capacity 150 GPM Total Weight 28000 lbs
Pump Storage 7300 Gals — Prine Mover Diesel
Hose Fittings 3.00 in — Number of Hoses 2
Pumping Head feet — Explosion Proof Yes
Hose Size 3.00 in — Hose Length 30

Company Name: Alchem-Tron, Inc.
Address: 7415 Bessemer Avenue
Cleveland, Ohio 44127

Contact: Sales Department Telephone: (216) 441-5628

SERVICES PROVIDED:

- ☒ Prepare Waste for Shipment
- ☒ Transport Waste
- ☒ Treat Waste
- ☒ Supply Manifest
- ☐ Prepare Annual Reports
- ☒ Recycle Waste
- ☒ Store Waste
- ☒ Dispose of Waste
- ☐ Prepare Manifest
- ☒ Perform Lab Tests
- ☒ Provide Containers
- ☒ Broker for Waste Exchange or Management Services

Comments: The facility is well diversified to provide complete waste disposal services. Only a very small amount of waste (e. g. PCB's) is brokered for disposal.

TYPES OF WASTES HANDLED :

- ☒ Liquid
- ☒ Solid
- ☒ Sludge
- ☐ Gas
- ☒ Solvent
- ☒ Ignitable
- ☒ Corrosive
- ☒ Waste Oil
- ☒ Reactive
- ☒ Halogenated Organics
- ☒ Inorganics/Heavy Metals
- ☒ Specific Process Wastes
- ☒ Organics
- ☒ PCB's

Comments: The company is equipped with a waste water treatment plant, solidification/fixation process, thermal process for various sludges, distillation, oxidation reduction processes, extraction process, etc. and modern laboratory for analysis of waste.

RESTRICTIONS ON WASTE ACCEPTED :

- ☐ Lab Report Must Accompany Waste
- ☐ Lab Tested Sample Must Accompany Shipment
- ☒ Specific Container Requirements. DOT approved containers only
- ☐ Only Company Owned Transporter Acceptable
- ☒ Minimum Amount Accepted. Order of $250 minimum
- ☒ Minimum BTU Value. No limit.
- ☒ Waste Generator Must be Insured

Comments: The company requires a waste profile sheet, sample of the waste and laboratory analysis before receiving the waste. The waste profile sheet is updated each year.

TYPES OF STORAGE, TREATMENT AND DISPOSAL METHODS AVAILABLE :

Storage:

- ☒ Drum
- ☒ Tank
- ☒ Waste Pile
- ☐ Impoundment
- ☐ Other

Treatment:

- ☒ Incineration. Only for sludges.
- ☒ Separation of Components
- ☒ Removal of Specific Components
- ☒ Chemical Treatment
- ☐ Biological Treatment
- ☒ Recycling. Solvents.

Disposal:

- ☒ Landfill
- ☐ Underground Injection Well
- ☐ Land Treatment
- ☒ Other. Various treatment on site.

Comments: The facility uses various treatment methods on its own site. The residue generat[illegible] landfilled (off-site). Treated aqueous waste after filtration and polishing is discharged to [illegible]

EPCS EQUIPMENT LIST

ALCHEM - TROY

UNIT #	TYPE	MODEL	SERIAL #	YEAR	MAKE	CAPACITY	LICENSE #
47	Tractor	RBM64-T	GPG2PGH830589	1975	White	N/A	11NS81
48	Straight Truck	Super Vacuum	X90XVGH2805	1980	Ford	4,000 gal.	14DT84
58	Van	E276H	E37HHDC9137	1979	Ford	15 drums	6J5064
90096	Van	Storage	AVE151001	1964	Fruehauf	50 drums	N/A
900147	Van	Storage	WV9145C	1955	Fruehauf	50 drums	N/A
900148	Tank Trailer	MC-312	UNC121802	1962	Fruehauf	5,500 gal	619M10
L256	Pick-Up	F-150	1FTEX14H2FKA48524	1985	Ford	3/4 ton	4LJ301
900049	Flatbed Trailer	N/A	315036	1976	Great Dane	42'	68FV12
900007	Dump Trailer	Triaxle	29714	1979	Thiele	20 yds^3	58
671062	Tank Trailer	MC-312	UNZ611219	1978	Fruehauf	7,500 gal	871S14
35221	Tank Trailer	MC-312	UNP442602	1979	Fruehauf	,500 gal	65971ST
5769	Pumper Vacuum STRAIGHT TRUCK	MC-307	5PRCPGG03062	1979	White	3,000 gal.	16AZ43

AMO POLLUTION SERVICES, INC.
412-921-8486

RD 2 BOX 311B
CANONSBURG, PA 15317

Effective March 1, 1988

24 HOUR SERVICE

NON HAZARDOUS SPILL EMERGENCY RESPONSE

TIME & MATERIAL PRICE LIST

Labor Rates:

Spillmaster	$ 40.00/hr.
Supervisor	30.00/hr.
Equipment Operator	18.00/hr.
Foreman	20.00/hr.
Cleaners/Laborers, full time employees	14.00/hr.
Cleaners/Laborers, temporary	11.00/hr.
Mechanic	18.00/hr.
For Major Spills (When Necessary)	
On-Scene Coordinator	18.00/hr.
	Plus Expenses
Consultant (technical and/or legal)	75.00/hr.
	Plus Expenses

Time and one-half charges apply before 7:00 AM and after 5:00 PM weekdays and all day Saturday.

Double time charges apply on Sundays and Holidays.

Per diem allowance of $60.00/day/person is charged when work area is over 50 miles from operating branch, or when conditions of work prevent employee from returning home.

Four (4) hour minimum applies to all labor and equipment.

Note: Under extremely hazardous conditions, to be determined by the Technical Director of AMO Pollution Services, Inc., the above rates may be increased.

Equipment Rates:

Vacuum Trucks:

Under 3,000 gallons capacity	$ 45.00/hr.
3,000 gallon capacity and over	65.00/hr.

Tractors, Trailers, and Utility Vans:

Tractors	$ 35.00/hr.
Tanker 4,500 gallon capacity and under	40.00/hr.
Tanker 5,000 gallon capacity 310-MC312 Code	45.00/hr.
40' Flat Bed Trailer	100.00/day
40' Box Van Trailer	75.00/day
42' Box Van Trailer	75.00/day
Utility Response Vans with Hydraulic Lift Gate	40.00/hr.

Small Trucks and Trailers:

Econoline Vans	$ 18.00/hr.
Crew Cab Trucks with 4-Wheel Drive	18.00/hr.
Pickup Trucks with 4-Wheel Drive	18.00/hr.
Regular 3/4 Ton and 1/2 Ton Pickups	13.00/hr.
Company Automobiles	8.00/hr.
Boom Trailers	75.00/day
Utility Trailers	25.00/day
Fuel & Permits-Surcharge	.7¢/mile for Large Trucks and Trailers
	.50/mile for Pickups and Automobiles

Hazardous Materials and Oil Spill Cleanup • Tank Cleaning • Liquid Disposal • Pipeline Cleaning • Marine Tank Cleaning

Specialized Equipment:

Chemical Response Van with Chemical Library	
Lab Safety Testing Equipment	$ 35.00/hr.
Mobile Field Office with Base Radio Station	40.00/hr.
Decontamination 40' Trailer	50.00/hr.

Off the Road Equipment:

All Terrain Vehicles	$ 10.00/hr.
International Harvester 3,500, Backhoe/Front-End Loader	35.00/hr.
	Plus Transportation
185 CFM Diesel Air Compressor	100.00/day
Portable Diesel Generator	100.00/day

Pumping & Decontamination Wash Down Equipment:

2" Stainless Steel Double Diaphragm Pump	$ 30.00/hr.
Jabsco Acid Pump	50.00/day
Hand Operated Acid Pump	20.00/day
Acid Hose 20ft. Lengths 2"-3"	$25.00/length/day
Steam Wagon	35.00/hr.
3,000 psi Hot/Cold Pressure Washer	30.00/hr.
2" Suction-Double Diaphragm Pumps	12.00/hr.
3" Suction-Double Diaphragm Pumps	16.00/hr.
3" Water Pump	10.00/hr.
2" Gasoline Driven Washdown Pumps	9.00/hr.

All Vacuum and Tank Trucks, Skimmers and Pumps are equipped with a standard amount of hoses. If additional hoses is required, the following charges apply:

2" Suction or Discharge (per 25 ft. length)	$25.00/length/day
3" Suction or Discharge (per 25 ft. length)	$25.00/length/day
Air Hose 3/4" or 2" (per 25 ft. length)	$25.00/length/day

Personal Protective Equipment (clothing):

Level A-Fully Encapsulating Chemical-Resistant Suit	$250.00/day
Level B-Chemical-Resistant Overalls (disposable)	30.00/ea.
Level C-Resistant Disposable Coveralls with Hoods	14.00/ea.
Level D-Disposable Coveralls	7.50/ea.
Disposable Spare Hoods Level B-C-D	4.00/ea.
Disposable Overboots (short)	4.00/pr.
Overboots Heavy Duty	15.00/pr.
Kneeboots Heavy Duty	50.00/pr.
Hipboots	45.00/pr.
Regular Raingear	20.00/set
Heavy Duty Raingear	40.00/set
Heavy Duty Apron	15.00/ea.
Gloves Butyl	25.00/pr.
Gloves Nitrile	15.00/pr.
Gloves Vinyl Coated	8.00/pr.
Glove Liners	1.50/pr.
Goggles	9.00/ea.
Splash Shield	10.00/ea.

Respiratory Protection:

(SCBA) Self-Contained Breathing Apparatus Level A	$100.00/day
Additional Air Bottles for Above	45.00/ea.
Cascade In-Line System with 3 Cylinders & Manifold	150.00/day
Mask and Bottles for In-Line System 100' Hose	95.00/day
Additional Air Cylinders for the Above 220 cu. ft.	50.00/ea.
Additional 50' Section Air Hose	$25.00/length/day
Cascade Recharging System with 4 bottles	150.00/day

Respiratory Protection Con't:

Additional Air Cylinders for the Above 220 cu. ft.	$ 50.00/ea.
Full Face Mask	15.00/day
Canister for the Above	28.00/ea.
Full Face Respirators	15.00/day/ea
Cartridges for the Above	10.00/set
Half Face Respirators	10.00/day/ea
Cartridges for the Above	10.00/set
Fresh Air Machine with Mask 100' Hose	150.00/day
Additional Air Masks & 100' Hose for the Above	60.00/day
Additional Air Hose 25' Sections	$15.00/length/day

Instruments:

Explosimeter	$ 35.00/day
Oxygen Meters	20.00/day
Ph Meter Portable	35.00/day
Lel Meter	50.00/day
Lead-In Air Detector plus Supplies	100.00/day
Drager Gas Detector plus Supplies	100.00/day
Radiation Counter	100.00/day

Miscellaneous Handling Equipment:

Explosion proof work light	$ 20.00/day
Drum Slings (Nylon)	35.00/day
Barrel Clamps for fork lift	50.00/day
Drum Cart	25.00/day
Fork lift plus Transportation	150.00/day

Communications Equipment:

Mobile Telephone plus cost per call	$ 20.00/day
Intrinsically Safe VHF-FM hand held transceiver	30.00/day
Mobile Command Center Equipped with base station	40.00/hr.

Water Equipment:

Small Craft without Motor, or 2-man rubber raft	$ 30.00/day
Under 14 ft. with motor	50.00/day*
14 ft. Workboat W/O.B	16.00/hr.*
16 ft. Workboat W/O.B	18.00/hr.*
18 ft. Workboat W/O.B	20.00/hr.*
20 ft. E-Z Cruise 40 and 50 HP, O.B	30.00/hr.
21 ft. Monarch Twin 85 HP, O.B	35.00/hr.
21 ft. Slick Craft I.O	40.00/hr.
21 ft. Bouton Whaler, Outrage, 115 HP, O.B	40.00/hr.
Skimmers Oleo, Maneray, and Acme	100.00/day

*If used without motor, one-half rate shown. Prices do not include cost of gasoline which will be an extra charge.

Harbor and Containment Boom - 6"-36" Skirt

Harbor Boom - First Hour or Day	$ 1.25/ft.
Harbor Boom - Each Succeeding Day	.75/ft/day
Off Shore Boom - First Hour or Day	2.50/ft.
Off Shore Boom - Each Succeeding Day	1.50/ft/day
Boom Cleanup (all types)	1.25/ft.

Small Power Tools:

Porter Saw	$ 30.00/day
Blower	25.00/day
Weed Eaters	35.00/day
Miscellaneous Small Hand Tools	$5.00/day/man/labor
Portable Wet-Dry Vacuum 30 gallon capacity	10.00/hr.

ASSOCIATED CHEMICAL AND ENVIRONMENTAL SERVICES, INC.

(ACES)

EQUIPMENT LIST

EFFECTIVE MARCH 1, 1985

876 Otter Creek Road
P.O. Box 7571
Oregon, Ohio 43616
(419) 726-1521

ACES

EFFECTIVE MARCH 1, 1985

ACES' LABOR

I. PERSONNEL CATEGORY

A. SUPERVISORY

1. CONSULTANT
2. ENGINEER, REGISTERED
3. ENGINEER, NON-REGISTERED
4. ENGINEER AIDE
5. PROJECT/SUPERVISOR
6. TECHNICAL ASSISTANT
7. FOREMAN
8. ASSISTANT FOREMAN

B. NONSUPERVISORY

1. HEAVY EQUIPMENT OPERATOR
2. RIGGER
3. OILER
4. MECHANIC
5. TRUCK DRIVER
6. FIELD TECHNICIAN
7. LABORER
8. SECURITY OFFICER
9. SCRIBE

EFFECTIVE MARCH 1, 1985

EQUIPMENT CATEGORY

VACUUM TRUCKS
1000 Gallon Skid Vac
1800 Gallon Vacuum Truck
3600 Gallon Vacuum Truck
3600 Gallon Super Vac Truck

PICKUPS AND VANS
Service Pickup/Van
4 Wheel Crew Cab w/Radio
4 Wheel Pickup w/Radio
4 Wheel Van w/Radio-Phone
4 Wheel Vehicle w/Snow Plow

STAKE AND UTILITY TRUCKS
10' Stake Truck
14' Stake Truck
18' Stake Truck
20' Stake Truck
2 Ton Stake Truck
Utility/Service-Flag Truck
24' Enclosed Van Truck

SPECIALIZED TRAILER UNITS (not including tractor)
Command Trailer
Decontamination Trailer
Hazardous Material Trailer
45' Drum Hauling Trailer

EQUIPMENT CATEGORY (unoperated)
Tool Trailer (small)
Tool Trailer (large)
Pollution Control Supply Unit
Electric Pneumatic and Water Unit

EFFECTIVE MARCH 1, 1985

TANKER UNITS

5000 Gallon Tanker
(includes tractor)

LOWBOYS, FLATBEDS, TRACTORS

40 Ft. Flatbed w/Tractor
12 Ton Lowboy w/Tractor
35 Ton Lowboy w/Tractor
50 Ton Lowboy w/Tractor
Over-The-Road Tractor Rig
Tandem Axle Sleeper Cab Tractor
(diesel)
Single Axle Diesel

BOATS

14' Jon Boat
14' Jon Boat
17' Boston Whaler (one motor)
24' Boston Whaler (two motors)

LIGHTING

Explosion Proof Lights
*1000 Watt Light Plant
*Tower Light Plant w/Generator
2 - Mecury Vapor Lights
*Tower Light Plant w/Generator
4 - Mercury Vapor Lights
250 Watt Light Stand
400 Watt Light Stand

*User furnishes fuel and labor. FOB ACES yard.

EFFECTIVE MARCH 1, 1985

GENERATORS

2.5 KVW Honda Generator
100 KVW Generator Trailer
5 KVW Generator
75 KVW Generator

AIR COMPRESSORS

125 CFM Air Compressor
600 CFM Air Compressor
Corpus Air Mover

PUMPS (Pumps w/20'suction, 50' discharge only. Extra hose additional)

Drum Pump (Hastalloy C)
Drum Pump (Plastic)
Drum Pump (Manual)
Drum Pump (Stainless Steel)
1.5" Centrifugal Pump
1.5" Gorman Rupp Pump
2" Gorman Rupp Pump
1.5" SS Diaphram Transfer Pump
2.0" SS Diaphram Transfer Pump
2.0" Aluminum Diaphram Transfer Pump
2.0" Electric Pump (1½ hp)
2.0" Electric Pump (2 hp)
2" Submersible Pump
3" Electric Pump
3" Submersible Pump
3" Gorman Rupp Trash Pump
4" Gorman Rupp Trash Pump

EFFECTIVE MARCH 1, 1985

6" Gorman Rupp Trash Pump
8" Crisafulli Pump w/Tractor
High Pressure Pump

HOSE

3/8" Breathing Air Hose (50 Ft.)
1½" Fire Hose (50 Ft.)
2" Fire Hose (50 Ft.)
2½" Fire Hose (50 Ft.)
3" Fire Hose (50 Ft.)
1½" Suction Hose w/Fittings (20 Ft.)
2" Suction Hose w/Fittings (20 Ft.)
3" Suction Hose w/Fittings (20 Ft.)
4" Suction Hose w/Fittings (20 Ft.)
6" Suction Hose w/Fittings (20 Ft.)
1½" Discharge Hose w/Fittings (50 Ft.)
2" Discharge Hose w/Fittings (50 Ft.)
3" Discharge Hose w/Fittings (50 Ft.)
4" Discharge Hose w/Fittings (50 Ft.)
6" Discharge Hose w/Fittings (50 Ft.)

SKIMMERS AND MOPS

Floating Saucer Skimmer
Manta Ray Skimmer
Mark II Oil Mop (200 Ft. 6" Mop)

BOOM

50' 4 x 4 Slickbar Boom
50' 4 x 6 Slickbar Boom
50' 6 x 6 Slickbar Boom
100' 4 x 6 Slickbar Boom
100' 6 x 6 Slickbar Boom

EFFECTIVE MARCH 1, 1985

RADIOS

Marine Radio

Two-Way Portable Radio

SORBENTS	Unit/Bale	Size
Grade 100	100 pads	18"x18"x3/8"
Grade 200	200 pads	18"x18"x3/16"
Grade 50	50 pads	36"x36"x3/8"
Sorbent Boom	4 Booms	10'x8"
	4 Booms	10'x5"
Sorbent Pillows	10 Pillows	14"x25"
Sorbent Sweeps	1 Sweep	19"X100'
Sorbent Blankets	1 Blanket	36"x150'
Sorbent Particulate		27 lbs
Corwed Rug		40"x300'

SAFETY EQUIPMENT

Level A1

Level A2

Level A3

Level B1

Level B2

Level B3

Level B4

Level B5

Level B6

Level B7

Level B8

NOTE: Levels A&B include 8 hours Air Supply

EFFECTIVE MARCH 1, 1985

SAFETY EQUIPMENT

Level C1
Level C2
Level C3
Level C4
Level C5
Level C6
Level C7
Level C8
Level D

DRUMS

Drum w/Polyliners (fusion)
Repack Drum
Poly Drum
Bung-Type Drum (reconditioned)
Disposal Drum (new) - 17E
- 17H
Open Top Drum (reconditioned)

ANALYTICAL & SPECIALIZED EQUIPMENT

Drum Identification Kit
Gas Tech Electronic Meter
Hach Spectrophotometer
Portable Lab Gear & Technical Material
Sampler
Specific Ion Meter
Specific Ion Meter Probe
Oxygen-Combustible & Meter

pH Meter

EFFECTIVE MARCH 1, 1985

ANALYTICAL & SPECIALIZED EQUIPMENT

MSA Air Sample Kit
Electric Pneumatic and Water Unit
Activated Carbon Cell
Irrigation-Aeration-Sprayer Pump
Aeration Setup
Sedimentation Separator
Mixed Media Filters - High Capacity
- Low Capacity
Small Filter Unit - Large
- Small

BACKHOES AND LOADERS (Unoperated)

JD 410 Backhoe
Bobcat Swinger
Bobcat 843
Bobcat 2000
Forklift
Komatsu PC 200 LC

BULLDOZERS

TD8 International
D65 P Wide Track
D3 Wide Track w/Winch & Hydraulic Angle Blade
D41P Wide Track

ENDLOADERS (Unoperated)

Crawlers:
977 L Cat w/3½ yard Bucket
955 K Cat w/4 yard Bucket

EFFECTIVE MARCH 1, 1985

ROAD GRADERS (Unoperated)
Cat Model #14 w/12' Blade

TRUCKS (Without Driver)
Single Axle Dump
14 Cubic Yard Tandem
16 Cubic Yard Tandem
Rip Rap Truck
20 Cubic Yard Semi Dump w/Tractor
12 Cubic Yard Sludge Truck

SPECIALIZED EQUIPMENT (Unoperated)
Swinger w/Drum Grappler
Hydraulic Drum Crusher
(not including setup)
Bobcat 843 w/Drum Grappler
Bobcat 2000 w/Drum Grappler
Komatsu PC 200 w/Drum Grappler

Bay West Environmental Contractor

DULUTH:
517 South 59th Avenue West
Duluth, Minnesota 55807
218 / 628-1093

ST. PAUL:
800 North Grotto Street
St. Paul, Minnesota 55104
612 488-1008

DATE: October 7, 1986

TO: Mr. Bill Fanning
E-Tech, Inc.
70 Dean Knauss Drive
Narragansett, Rhode Island 02882-1443

FROM: Rondi C. Erickson, President

RE: List of Oil and Hazardous Waste Cleanup Companies
US Army Corps of Engineers, Detroit District

BAY WEST, INC. CAPABILITIES

24 Hour Response:

St. Paul, MN office	612/488-1008
Duluth, MN office	218/628-1093

Service Area:
National for Investigations and Remedial Action
Upper Midwest for Emergency Response (MN, WI MI, SD, ND, IA)

Staff:

Project Managers	3
Civil Engineers	2
Hydrogeologists	2
Geologists	2
Chemists	1
Industrial Hygienest/ Toxicologist	1
Transportation and Disposal Coordinator	1
Field Supervisors	3
Well Driller	1
Hazardous Material Specialists	3

Protective Gear:

Level A	4
Level B	12
Level C	20
Safety Eyewash	2
Cascade System	2
Shower Trailer	1
Man Winch/Hoist	1

Monitoring Equipment:

Foxboro OVA GC	1
TLV Meter	2
O_2 Meter	2
Drager Meter	2
Gutie Pie Radioactivity Meter	1
Metal Detector	1
Sonic Oil/Water Detector	8
Bailers	10+
Geoflo Model 30	1
Flashpoint Tester	1
pH Meter	2
Conductivity Meter	1
Explosimeter	2
Petrotite Tank Testing Equipment	2

Pumps:

- Trash - Diaphragm
- Centrifugal
- Double Diaphragm (air)
- Acid
- Submersible
- Peristaltic

Surface Water Recovery:

Boats with Motors	4
Skimmers	multiple
Containment boom	

Ground Water Recovery:

- Cone of Depression Systems
- Total Fluid Ejector Systems
- Shallow Vacuum Systems
- Well point systems
- Oil/water separators
- Counterflow Air Stripping Towers
- Carbon Adsorption Modules
- Biological Treatment Systems

Vehicles & Trailers

Vacuum Trucks	2
Lowboy/tractor	1
Trucks with hoist	2
Boom Truck	1
Service Trucks	multiple
Drill Rigs	2

SOMBRA, ONTARIO

CONTACT: Canadian Coast Guard Sub-Base Amherstburg
Office: 519-736-5449

BOOM/FENCING

91m	91cm Bennett Oil Boom
564m	45cm Flexy Oil Boom
6	Admiralty Anchors - 45 kg
3	Danforth Anchors - 6 kg
11	Danforth Anchors - 14.5 kg
3	Towing Paravanes - 45cm
10	Anchor Buoys - 45cm Diameter

SKIMMERS/PUMPS/TANKS

1	Slurp Weir c/w 9m of Suction and Discharge Hoses
1	Spate Pump - Diesel
2	6820 Porta-Tank

SORBENTS/CLEANING EQUIPMENT

5	Roll Conwed Blanket
13	Roll 3M Blanket
10	Bag Sorbent C
42	Box Oil Snare

SAFETY EQUIPMENT/SPECIAL CLOTHING

- Life Jackets
- Work Clothing
- Rain Suits
- Gloves
- Rubber Boots

GENERATORS/LIGHTS

1	Portable Electric Generator - Honda 2500E
2	Flood Light Unit - 300W

OTHER EQUIPMENT/MATERIALS

- Ropes
- Tools
- Rakes
- Forks
- Shovels
- Axes

GENERATORS/LIGHTS

2	Portable Electric Generators - Honda 2500E
4	Flood Lights Units - 300 W

OTHER EQUIPMENT AND MATERIAL/LOCAL RESOURCES

- Ropes
- Cables
- Shovels
- Rakes
- Forks
- Safety Stands
- Tools
- Anchors, etc.

AMHERSTBURG, ONTARIO.

CONTACT: Canadian Coast Guard Sub-Base
Office: 519-736-5449

BOOM/FENCING

610m	91cm Bennett Inshore Oil Boom
152m	45cm Flexy Oil Boom
2	Boom Trailers c/w Pallets
10	Bridle Tow Bars
2	Boom Towing Paravanes - 91cm
2	Boom Towing Paravanes - 45cm
10	Danforth Anchors - 14.5 kg
10	Anchor Buoy - 45cm Dia

SKIMMERS/PUMPS/FITTINGS

1	Komara Mini-Skimmer c/w Drive Unit & Hydraulic Hoses
2	Spate Pumps - Diesel
2	Slurp Weirs c/w 9m Suction & Discharge Hoses
2	6820 Porta-Tanks

SPECIAL VEHICLES

1	Chev Suburban Truck - Electric Winch and Towing Package
1	8m x 3m Sea Truck c/w Tier Tilt Boat Trailer

COMMUNICATIONS

6	Motorola VHF-FM Handie Talkies
2	110 Volt Battery Chargers for Handie Talkies
1	Motorola 30W VHF-FM Mobile Base Unit
1	Marconi Under Dash Mobile FM Radio
7	Sony Cassette Tape Recorders
1	Com 2 Way VHF-FM Marine Radio
1	110 Volt 6 Unit Battery Charger for Handie Talkies

SORBENTS/CHEMICAL TREATING AGENTS/APPLICATION EQUIPMENT

18	Rolls Conwed Sorbent Blankets
1	Steam Jenny

SAFETY EQUIPMENT/SPECIAL CLOTHING

- Life Vests
- Work Coveralls
- Boots
- Gloves
- Rain Suit
- Parkas, etc.

C&K INDUSTRIAL SERVICES

[redacted]
5617 Schaaf Road, Cleveland, OH 44131 216-642-0055

EQUIPMENT LIST - large equip. only

VACTOR 2045 UNITS: 7 units

16 cubic yard holding capacity

4500 cfm blower @ 16" of mercury

these units are capable of handling wet or dry material conveyance from up to 500'.

VACTOR 1200 UNITS: 2 units

16 cubic yard holding capacity

2 centrifical fans power the vacuum function

jet rodder pump provides 2000 psi @ 60 gpm

These units are sewer cleaning machines capable of flushing and vacuuming debris in sewer lines at the same time.

ELGIN WHIRLWIND II: 3 units

7 cubic yard capacity

1 centrifical fan provides vacuum power

These units are the state of the art in street sweeping technology. They are capable of sweeping bricks, cans, asphalt grindings and other heavy materials that other machines cannot.

SUPPLY VEHICLES: C & K Industrial maintains a fleet of 15 supply and support vehicles to service the above units.

CECOS INTERNATIONAL

	Niagara Falls, NY	Williamsburg, OH	Cincinnati, OH (Spring Grove)	Bridgeport, CT (CTC)	Chicago, IL	Edison, NJ	Livingston, LA (GULF REGION)	Sulphur, LA (Calcasieu Parish) (GULF REGION)	Odessa, TX (GULF REGION)
SERVICES									
WASTEWATER TREATMENT	●		●	●					
DEEPWELL								●	●
*FUELS BLENDING	●		●	●					
PCB TRANSFORMER DE-COMMISSIONING			●	●					
TRANSFER STATION	●		●	●			●	●	
INDUSTRIAL LANDFILL	●						●		
PCB PERMITTED LANDFILL	●	●							
SECURE LANDFILL	●	●					●		
REMEDIAL SERVICES	●		●	●	●	●	●		
TRANSPORTATION	●	●		●			●	●	●
CAPABILITIES									
CYANIDE DESTRUCTION				●					
CHEMICAL FIXATION/ STABILIZATION			●				●		
CHEMICAL OXIDATION	●			●					
CHEMICAL PRECIPITATION	●			●				●	
NEUTRALIZATION	●			●			●	●	
CHEMICAL FILTRATION/ SEPARATION	●		●	●					
*PCB INCINERATION (LIQUIDS/SOLIDS)	●		●	●			●		

*In conjunction with permitted facilities.

10/7/86

Egeler Industrial Waste

9246 Cedar Run Rd.
Traverse City, Mich. 49684
(616) 946-6801

TO;E-TECH INC.
SUB: EQUIPMENT LIST
ATTN: BILL FANNING

MR. FANNING, PER YOUR LETTER DATED, 9/30/86,, WE SUBMIT THE FOLLOWING EQUIPMENT LIST..

EQUIPMENT	LOCATION
SPILL TECHNICIAN (2)	TRAVERSE CITY, MI.
CLEAN UP CREW (6)	TRAVERSE CITY, MI.
VACUUM TRUCKS,3,000 GALLON (2)	TRAVERSE CITY, MI.
VACUUM TRUCK 3,000 GALLONS (1)SS	MUSKEGON, MI.
VACUUM TRAILER 5,500 GAL,SS	TRAVERSE CITY, MI.
CLEAN UP CREW (2)	MUSKEGON,MI.
TANKER TRAILER 8,700 GAL,	TRAVERSE CITY,MI.
TANKER TRAILER INSULATED 7,800 GAL	TRAVERSE CITY, MI.
TANKER TRAILER 6,750 GAL. INSULATED	TRAVERSE CITY, MI.
TANKER TRAILER INSULATED SS 5,500 GAL	TRAVERSE CITY,MI
VAN TRAILER 40 FT. COLOSED	TRAVERSE CITY, MI
SEMI TRACTORS (3)	TRAVERSE CITY, MI.
3" AND 2" HOSE	TRAVERSE CITY & MUSKEGON, MI.
SPILL RESPONSE TRAILER WITH RAKES, SHOVELS, SCBA PACKS GENERATOR, PORTABLE AIR,(BREATHING) SKIMMERS, SORBENT MATERIAL, RAIN SUITS,BOOTS, GLOVES,PORTABLE LITES	TRAVERSE CITY, MI.
WATER TABLE DEPRESSION PUMP	TRAVERSE CITY, MI.
SCAVENGER PUMP (HYDROCARBONS)	TRAVERSE CITY, MI.
LABOR CREW AVAILABLE WITH 3hrs	
10 MEN	TRAVERSE CITY, MI.
14FT WORK BOAT W/TRL	TRAVERSE CITY, MI.
EMPTY DRUMS	TRAVERSE CITY, MI.
OIL RETAINER BOOM 350 FT.	TRAVERSE CITY, MI.

IN GENERAL WE COMPLETE CAPABILITY TO CLEAN UP SPILLS ON EITHER LAND OR WATER

ENHANCO 1

04/11/86

INVENTORY PRICE 3	DESCRIPTION	UNIT
#10 OT	VAC TRUCK & OPER. 3000 G	HR.
#10 ST	VAC TRUCK & OPER. 3000 G	HR.
#101 OT	BOBCAT & OPERATOR	HR.
#101 ST	BOBCAT & OPERATOR	HR.
#102 OT	BACK HOE 580 & OPER.	HR.
#102 ST	BACK HOE 580 & OPER.	HR.
#103 OT	EXCAVATOR 880 & OPER.	HR.
#103 ST	EXCAVATOR 880 & OPER.	HR.
#104 OT	EXCAVATOR 225 & OPER.	HR.
#104 ST	EXCAVATOR 225 & OPER.	HR.
#105 OT	EXCAVATOR 666 & OPER.	HR.
#105 ST	EXCAVATOR 666 & OPER.	HR.
#106 OT	H-65 LOADER & OPER.	HR.
#106 ST	H-65 LOADER & OPER.	HR.
#107 OT	DOZER D-6 & OPERATOR	HR.
#107 ST	DOZER D-6 & OPERATOR	HR.
#108 OT	DOZER 850 CASE & OPER.	HR.
#108 ST	DOZER 850 CASE & OPER.	HR.
#11 OT	VAN TRUCK 14 FT.	HR.
#11 ST	VAN TRUCK 14 FT.	HR.
#11T OT	BULK TANKER & OPER 6600 G	HR.
#11T ST	BULK TANKER & OPER. 6600	HR.
#12 OT	TRACTOR & OPER.	HR
#12 ST	TRACTOR & OPER.	HR.
#12T OT	VAC TANKER & OPER. 5000	HR.
#12T ST	VAC TANKER & OPER. 5000	HR.
#13T OT	BULK TANKER & OPER. 8000	HR.
#13T ST	BULK TANKER & OPER. 8000	HR.
#14 OT	TRACTOR & OPER.	HR.
#14 ST	TRACTOR & OPER.	HR.
#14T OT	VAN TRAILER & OPER.	HR.
#14T ST	VAN TRAILER & OPER.	HR.
#15T OT	BULK TANKER & OPER. 6000	HR.
#15T ST	BULK TANKER & OPER. 6000	HR.
#16 OT	TRACTOR & OPER.	HR.
#16 ST	TRACTOR & OPER.	HR.
#16T OT	DUMP TRAILER & OPER.	HR.
#16T ST	DUMP TRAILER & OPER.	HR.
#17T OT	ROLL OFF & OPERATOR	HR.
#17T ST	ROLL-OFF & OPER.	HR.
#18 OT	TRACTOR & OPER.	HR.
#18 ST	TRACTOR & OPER.	HR.
#18T OT	VAC TANKER & OPER. 6000	HR.
#18T ST	VAC TANKER & OPER. 6000	HR.
#19T OT	ROLL OFF & OPER.	HR.
#19T ST	ROLL OFF & OPERATOR	HR.
#20 OT	TRACTOR & OPER.	HR.
#20 ST	TRACTOR & OPER.	HR.
#20T OT	BULK TANKER & OPER. 6500	HR.
#20T ST	BULK TANKER & OPER. 6500	HR.
#21T OT	BULK TANKER & OPER. 6500	HR.

04/13/86 ENHANCO 2

INVENTORY PREOE 3	DESCRIPTION	UNIT CAT
#72 AOT	ADMIN. SERV.-SCISLOWICZ	HR.
#72 AST	ADMIN. SERV.-SCISLOWICZ	HR.
#73 DOT	OPERATOR - MULLINS	HR.
#73 DST	OPERATOR - MULLINS	HR.
#78 MHOT	MAT. HANDLER - WOLOSION	HR.
#78 MHST	MAT. HANDLER - WOLOSION	HR.
#8 OT	VAC TRUCK & OPER. 3000 G	HR.
#8 ST	VAC TRUCK & OPER. 3000 G	HR.
#82 MHOT	MAT. HANDLER - RACZ	HR.
#82 MHST	MAT. HANDLER - RACZ	HR.
#84 AOT	ADMIN. SERV.-RETTEL	HR.
#84 AST	ADMIN. SERV.-RETTEL	HR.
#85 MHOT	MAT. HANDLER - BAUMAN	HR.
#85 MHST	MAT. HANDLER - BAUMAN	HR.
#86 DOT	OPERATOR - WILKINS	HR.
#86 DST	OPERATOR - WILKINS	HR.
#88 MHOT	MAT. HANDLER - WHITE	HR.
#88 MHST	MAT. HANDLER - WHITE	HR.
#89 MHOT	MAT. HANDLER - MCKELVEY	HR.
#89 MHST	MAT. HANDLER - MCKELVEY	HR.
#90 MHOT	MAT. HANDLER - WRIGHT	HR.
#90 MHST	MAT. HANDLER - WRIGHT	HR.
#93 DOT	OPERATOR - HEBERLING	HR.
#93 DST	OPERATOR - HEBERLING	HR.
#FBC OT	FLAT BED TRL. & OPER.	HR.
A.E.D.	LIFE SUP. EQUIP. & OPER.	DAY
A.E.H.	LIFE SUP. EQUP. & OPER.	HR.
FBC ST	FLAT BED TLR. & OPER.	HR.
RCBRD	ROLL-OFF BOX RENT - DAY	DAY
RCBRM	ROLL-OFF BOX RENT - MONTH	MTH

Tug Boat (40')
Work Barges (60')
Work Boats (24')
Work Boats (26')
Work Boats (30')
L.C.M. (60')
Work Boat (14')
24 KW Generator
315 CFM Compressor
600 CFM Compressor
3" Diaphram Pumps
3" Hi Press Pumps
Oil Boom (cleanup cost extra)
Ambient Air Equipment
Decontamination Trailer

ENVIRONMENTAL CONTROL SERVICES, INC.

GENERAL OFFICES:

5339 Clay St., S.W. • Wyoming, MI 49508 • Phone (616) 532-5767

October 4, 1986

Bill Fanning
Research Engineer
E-Tech Inc.
70 Dean Knauss Dr.
Narragansett, Rhode Island 02882-1443

Dear Mr. Fanning;

In response to your request for information, the following is offered:

Environmental Control Services, Inc.
5339 Clay Street, SW
Wyoming, MI 49508

Office and 24 hour emergency response number: 616-532-5767

Business: Commercial, industrial and hazardous waste transporter. Emergency chemical spill control. Hazardous waste characterization and disposal site location, services.

Operating Permit: EPA#MIT 270 011 190
Mich License #126

Equipment:

Grand Rapids
- 1 - 580 Backhoe
- 1 - Van Trailer
- 1 - Bulk Tankers, 6000
- 1 - Vacuum Tanker, 5500 gallons
- 15 - Roll Off Boxes, 20 - 40 cu yd

Detroit
- 1 - Mobile Spill Van
- 1 - DeCon Trailer Unit
- 3 - Bulk Tankers, 6600, 6500, 6000 gal
- 2 - Vacuum Tankers, 3000, 6600 gal

Miscellaneous: Scott Air Packs, Protective clothing, absorbent pads, booms

Manpower: Grand Rapids 10 personnel
Detroit 25 Personnel

Please call should you require any further information. Would it be possible to obtain a copy of the listed appendix?

Respectfully,

Thomas Lake

Thomas Lake
Industrial Waste Consultant

ENVIRONMENTAL POLLUTION CONTROL, INC. • 36700 S. HURON ROAD • NEW BOSTON, MI 48164 • 313-753-4416

EPC

November 14, 1986

Mr. Maylo Murday
E-TECH, INCORPORATED
70 Dean Knauss Drive
Narrigansett, Rhode Island 02882

Dear Mr. Murday:

Submitted is a list of Environmental Pollution Control Inc.'s owned and/or operated equipment as requested. In addition, EPC works closely with various other subcontractors to enhance it's capabilities to provide a broader range of services. Among these subcontractors are C.T.I. and Associates, Kumar Malhorta and Associates Inc., Prein and Newhof, and Canton Analytical Laboratory (an equipment list is submitted).

I hope this information will be sufficient and if their is anything that is needed in the future, please do not hesitate to contact me.

Sincerely,

ENVIRONMENTAL POLLUTION CONTROL, INC.

Kenneth J. Gaffney

Ken Gaffney
Hazardous Waste Specialist

KG/mh
Enclosure

ATTACHMENT D

9(A). Field Analytical Equipment

EPC owned and/or operated equipment:

Quantity	Description/Type
1	Portable Hood w/Vacuum
1	Model 62 Gascope Combustable Gas Indicator #746
1	Model 2A Explosimeter Combustable Gas Indicator #90061
1	Baush & Lomb Stereo Microscope #J1245
2	Baush & Lomb Phase Contrast Microscope: #B-37432 #B-54825R
1	Olypus Polarized Light Microscope #664-561
1	Olypus Rotating Stage
3	Micromax High Volume Pump
3	Air Check Pump Charger
18	Air Check Sampler
3	SKC Air Pump Calibrator
2	Air Cadet Vacuum Pump
7	Nilifisk HEPA Vacuum
6	Microtrap Negative Air Filtration Unit
1	Millipore Filter Pump
1	ACT Surfactant Applicator 250psi

Prein and Newhof owned and/or operated equipment:
(See separately attached materials.)

CAL owned and/or operated equipment:
(See attachment D-1 for complete list.)

Quantity	Description/Type
1	CME 75 Rig (rotary or hollow stem augers)
1	CME 45 (rotary or hollow stem augers)
1	Bucyrus-Erie 10R Drill Rig (rotary with mud or air-drilling capability up to 18" diameter/300' deep)
1	Loomis Model 24 Cable Tool Rig
-	Johnson-Keek Resensitivity Equipment
-	Seismic Equipment
-	Magnetometers
-	Miscellaneous pumps, packers, field pressure permeability tests, etc.

In addition, CAL maintains an 18' Odessey trailer as a mobile laboratory which can be further outfitted to meet instrumentational demand of a specific project.

9(B). Analytical Capabilities

EPC possess full capabilities to perform the specific EPA methods listed in publications EPA-50014-79-020, Methods for Chemical Analysis of Water and Wastes; EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal and Industrial Waste Water; and SW-846, Test Methods for Evaluating Solid Waste.

Laboratories Utilized:

1. Prein and Newhof
   Grand Rapids, Michigan

2. Canton Analytical Laboratories (CAL)
   Ypsilanti, Michigan

9(C). Construction, Excavation, and Waste Movement Equipment

EPC owned and/or operated equipment:

Quantity	Description/Type		
1	1973 Fruehauf Tank Trailer 9,300 gals.		
1	1973 Fruehauf Tank Trailer 7,333 gals.		
1	1975 Fruehauf Vacuum Tank Trailer 5,000 gals.		
1	1980 Fruehauf Dump Trailer 24 cu. yds.		
1	1980 Fruehauf Dump Trailer 30 cu. yds.		
1	1980 Great Dane Van Trailer 70 drums		
3	1976 Ford Van Truck 35 drums		
1	1979 Mack Tractor	weight:	10,000 lbs.
1	John Deere	844D	Loader, 5yd
1	Cat	245	Back Hoe, 4yd
1	Northwest	95	Dragline, 3yd
1	Michigan	275	Front End Loader,7yd
1	Kohering	1066D	Back hoe, 31/2yd
1	Cat	D8K	Dozer
1	Cat	977L	Loader, 3yd
1	Cat	977L	Loader, 31/2yd
1	Cat	D6C	Dozer
1	Cat	D4D	Dozer
1	Cose	580C	Back Hoe, 3yd
1	Galson	T500	Grader
1	Freuhauf	Vacuum Tanker	5,000 gal.
1	Cose	580K	With grappel & safety shields
1	Cat	215	With grappel & safety shields
1	Freuhauf	---	40yd gravel trains, water tight (4)
1	Freuhauf	---	17,000 gal., double bottom tanker
1	IH	Transtar	Tractor, (4)

9(D). Safety Equipment

EPC owned and/or operated equipment:

Quantity	Description/Type
2	Portable Decontamination Units (3 stage shower units)
32	Cartridge Respirators
5	MSA Powered Air Purifying Respirators
4	MSA Self Contained Breathing Apparatus
Constant Supply	Tyvek suits
Constant Supply	Rubber boots
"	Rubber gloves
"	Head gear
"	Material Data Safety Sheets
"	First Aid Kits

Prein and Newhof owned and/or operated equipment:
(See separately attached materials)

CAL owned and/or operated equipment:

Quantity	Description/Type
6	Portable eyewash units
2	Showers
3	Fixed eyewash stations
3	Fire blankets
3	Fume hoods
Constant supply	Personal Respirators
" "	Tyvek suits
" "	Rubber suits
" "	Rubber boots
" "	Rubber gloves
" "	Head gear
" "	Material Data Safety Sheets
" "	First Aid Kits

Attachment D-1

CAL Equipment

Department	Number of Personnel	% Time Available	Degree	CAL, Years Experience
AA/ICAP	1	100	B.S., Chem.	4
	1	100	B.S., Chem.	3
	1	100	B.S., Chem.	3
	1	100	B.S., Chem.	2
GC/MS	1	50	Ph.D., Chem.	15
	3	75	M.S., Chem.	10
COMPUTER	5	75	B.S., Chem.	5
SAMPLE PREP	3	50	B.S., Chem.	3
GC	5	75	M.S., Chem.	5

Please note Neutron Activation Analysis is performed at the University of Michigan (Ann Arbor), Phoenix Memorial Laboratory, a 2 megawatt reactor available for use by Canton Analytical Laboratory.

5.3. CANTON ANALYTICAL LABORATORY EQUIPMENT LIST

ORGANIC ANALYSIS INSTRUMENTATION

Manufacturer	Model	Description
Astro Resources	1850	Total Organic Carbon Analyzer, persulfat UV digestion, microprocessor controlled, with integrator and printer, I.R. detect
Dohrman	DX-20	Total Organic Halide Analyzer, pyrolyzer with micro-coulometric titrator, direct readout integrator.
Dohrman	AD-2	Adsorption Module for TOX Analyzer, with four places and nitrate rinse.
Shimadzu	GC-RIA	Gas Chromatograph, full computer control, with dual FID and ECD, temperature progra mable.
Shimadzu	GC-RIA	Gas Chromatograph, full computer control, with dual FID and ECD, temperature programmable.
Sh adzu	GC-8A	Gas Chromatograph, dual FID, temperature programmable, equipped with gas sampler.
Shimadzu	GC-8A	Gas Chromatograph, dual FID, temperature programmable, equipped with gas sampler.
ewlett-Packard	5840A	Gas Chromatograph, full computer control, with dual FID and ECD, temperature program mable.
himadzu	CR1B	Computer Data Processor
himadzu	RPR-G1	Computer Data Processor
himadzu	RPR-G1	Computer Data Processor
himadzu	RPR-G1	Computer Data Processor
racor	310	Hall Electrolytic Conductivity Detector
racor	700A	Hall Electrolytic Conductivity Detector
ekmar	LSC-2	Purge and Trap Module, microprocessor controlled.
ew t-Packard	100	Recorder, X-Y, high speed
argent	B-1	Recorder, with Disc Integrator

ORGANIC ANALYSIS INSTRUMENTATION (Cont'd)

Manufacturer	Model	Description
AEI	MS-30	GC/MS with VG-2050 data systems. The system is capable of pyrolysis GC/MS, single ion monitoring, and purge and trap GC/MS. quantity: 2
Shimadzu	GC-8A	Gas Chromatograph, Dual TCD, temperature programmable, equipped with gas sampling valve and cryogenics
Shimzdzu	C-R-3A	Computer Data Processor
Tracor	117540	Ultrasonic Detector

INORGANIC ANALYSIS INSTRUMENTATION

Manufacturer	Model	Description
Orion Research	211	pH Meter
Orion Research	211	pH Meter
Horizon	1484-10	Specific Conductance Meter
Yellow Springs	54 RC	Dissolved Oxygen Meter
GasTech	GP-204	Combustible gas Detector
HF Instruments	DRT 100	Turbidimeter
Enmet CGS-10	Combustible, Toxic, Oxygen Analyzer	
Orion Research	901	Microprocessor controlled Specific Ion Me
Orion Research	901	Chloride Electrode
Orion Reserach	901	Residual Chlorine Electrode
Orion Research	901	Cyanide Electrode
Orion Research	901	Ammonia Electrode
Orion Research	901	Fluoride Electrode
Orion Research	901	Oxygen Electrode
Orion Research	901	Oxygen Electrode
Fisher	13-497-5	Pensky-Martens Flash Point Tester
Weaton	--	Distillation Apparatus, 8 place, complete for TKN, COD, Cyanide and Phenols
Baush & Lomb	Spectronic 70	Colorimeter, Concentration Computer
Baush & Lomb	Spectronic 100	Colorimeter, Concentration Computer
Baush & Lomb	Spectronic 20	Colorimeter
Technicon	Sampler IV	Technicon Auto Analyzer Continuous Distillation Apparatus 3 Channel Proportioning Pump III Continuous Distillation Apparatus Recorder, 3 pen Single Channel Colorimeter Singel Channel Colorimeter Phenol Module Cyanide Module Ammonia Module Phosphorus Module TKN Module COD-EPA

INORGANIC ANALYSIS INSTRUMENTATION (cont'd)

Manufacturer	Model	Description
Hach	CO-1	APHA Color Comparator
Wallace & Tiernan	--	Color Comparator
Hach	--	COD Reactor

ATOMIC ABSORPTION INSTRUMENTATION

Manufacturer	Model	Description
Perkin-Elmer	5000	Atomic Absorption Spectrophotometer, six lamp turret, magnetic card controlled, electronic burner control, equipped with accessories for flame, nitrous oxide, hydride generator, furnace, impact bead and EDL.
Perkin-Elmer	560	Atomic Absorption Spectrophotometer, ful electronic keyboard control, microproces controlled, equipped with accessories fo flame, nitrous oxide, hydride generator, furnace, EDL, and cold vapor.
Perkin-Elmer	HGA 2100	Heated Graphite Furance System
Perkin-Elmer	057	EDL Power Supply
Perkin-Elmer	040	EDL Power Supply
Perkin-Elmer	MHS-10	Hydride Generator System
rkin-Elmer	MHS-10	Hydride Generator System
Perkin-Elmer	AS-50	Auto Sampler System
Perkin-Elmer	056	High Speed Recorder
Perkin-Elmer	Various	Electrodeless Discharge lamps, quantity: Hollow Cathode Lamps, quantity: 36

BACTERIOLOGICAL EQUIPMENT

Manufacturer	Model	Description
Lab Line	Cat.#3000-2	Water Bath
Lab Line	Cat.#3000	Water Bath
Napco	3394	Incubator
Market Forge	Sterilmate	Autoclave
Avanti	37-9RG	Darkfield Quebec Colony Counter
Millipore		Forceps
Gelman	4205	Filtration Manifold
Gelman	--	Filtration Funnel and Support
VWR		Vacuum Pump
Anchor Optical	--	Binocular Microscope
Baush & Lomb	--	Microscope with il mmersion
Baush & Lomb	BH2	Polarized Light Microscope
Baush & Lomb	--	Fluorescent Light Source
Baush & Lomb	Balplan	Phase Contrast Microscope
Bauch & Lomb	--	Incandescent Light Source
Sampling loops	--	quantity: 1 doz.
Alcohol Burner	--	quantity: 1
Kimax	--	2 l vacuum Flask, quantity: 1

GENERAL LABORATORY EQUIPMENT

Manufacturer	Model	Description
Precision Scientific	Thelco 118	Laboratory Oven
Fisher	501	Laboratory Oven
Fisher	55G	Laboratory Oven
Heavy duty	051-PT	Muffle Furnace
Tecam	PTC-2	Programmable Temperature Controller
Tecam	DG 41	Block Digestor, 20 place
Technicon	BD-1	Block Digestor, 20 place, programmable
Precision	251	Water Bath
Precision	--	Water Bath
Fisher	130	Water Bath
cision	--	BOD Incubator, -10 to 50°C, 26 cubic ftt.
Westinghouse	Frost Free	21 cubic ft., Locking for Chain of Custody Refridgerator
Westinghouse	--	21 cubic ft., Refridgerator
Kelvinator	75B-R	Refridgerator, Locking for Chain of Custod
Sears	Coldspot	Refridgerator, Frostless, 16 cubic ft.
Welbilt	--	Refridgerator, 21 cubic ft.
Corning	1-AG	Water Still, glass, 1-4 liter/hour.
Corning	10-AG	Water Still, glass, 9 liter/hour, automatic collection and shut-off.
Thermolyne	HPA 2235M	Hot Plate
Thermolyne	HPA 2235M	Hot Plate
Thermolyne	HPA 2235M	Hot Plate
Thermolyne	HPA 2235M	Hot Plate
Fisher	284	Hot Plate

GENERAL LABORATORY EQUIPMENT (Cont'd)

Manufacturer	Model	Description
Corning	PC-351	Hot Plate Stirrer
Fisher	318	Hot Plate Stirrer
Sybron	SP-18425	Hot Plate Stirrer
Fisher	120MR	Hot Plate Stirrer
Tekpro	H2397-1	Hot Plate Stirrer
Fisher	115	Magnetic Stirrer
Fisher	--	Magnetic Stirrer
Sybron	M 16715	Magnetic Stirrer
Corning	PC353	Magnetic Stirrer
Scientific Industries	12-812	Magnetic Stirrer
[illegible]sher	14-511-1A	Magnetic Stirrer
Fisher	220 PL	Vortex Mixer
Greiner Scientific	--	Stirring Motors, quantity: 2
Memcor	--	Stirring Motors
RAE	102	Stirring Motor quantity: 10
Glas-Col	--	Heating Mantle, 500 ml, quantity: 8
Sartorius	2492	Electronic Analytical Balance
Mettler	AK 160	Electronic Analytical Balance
Ohaus	Dial-o-gram	Triple Beam Balance
Torsion	11-5	Torsion Balance
Fisher	--	Marble Weighing Table
Gelman	4205	Filtration Manifold, quantity: 2
[illegible]man	4200	Magnetic Filter Funnel, quantity; 6

GENERAL LABORATORY EQUIPMENT (Cont'd)

Manufacturer	Model	Description
Gelman	13154	Vacuum Pump
Sargent	--	Vacuum Pump, 1 HP, large capacity
Millipore	--	Pressure Filter Apparatus, 142 mm, Teflon, S.S.
Labcon o.	--	Laboratory Carts, quantity: 3
Fisher	--	Laboratory Carts, quantity: 2
Labcon o.	--	Fume Hood, 3 feet
Fisher	--	Fume Hood, 6 feet
Fisher	--	Fume Hood, 8 feet
P.S.	--	Fume Hood, for A.A.
P.S.	--	Fume Hood, for A.A.
Various	--	Cabinets, with work surface, sinks, gas outlets, deionized water outlets, and oth utilities as requied, in excess of 120 linear feet.
Various	--	Glassware, all necessary general and speciality to operate a complete environs laboratory.
Various	--	Reagents and Standards, an inventory listing in excess of 1,000 compounds.
Heinicke Inst.	Typhoon	Dishwasher
Fisher	--	Dessicators, large, stainless steel
Eberbach	--	Shaker, platform, large capacity
Red Devil	5214	Shaker, heavy duty, large capacity
Oxford Labs.	Macro Sets	Automatic Pipettors, 0-5 ml
Oxford Labs	Macro Sets	Automatic Pipettors, 5-10 ml
U- 'son	--	Ultra-Sonic bath, 2 gallon capacity

GENERAL LABORATORY EQUIPMENT (Cont'd)

Manufacturer	Model	Description
Brinkman	--	Automatic Pipettors, 0-10 ml
Oxford	--	Automatic Pipettors, 0-10 ml
IEC	--	Centrifuge
IEC	--	Centrifuge
Fisher	241	Automatic Diluter
Fisher	241	Automatic Diluter
Culligan	--	Deionizer, large capacity
Turner Eng.	--	Fluorimeter
Fisher	--	Sieves (various), Sieve Shaker

FIELD EQUIPMENT

Manufacturer	Model	Description
Pontiac	Catalina Safari	Diesel Station Wagon, 1982
Chevy	Caprice Classic	4 door Sedan, 1977
Ford	F150	Pick-up, 4 wheel drive with all terrain tires, 1983
Dodge	--	Pick-up, 4 wheel dirve with all terrain tires, 1983
Polyfoam Packers	--	Temperature Controlled Shipping Contain quantity: 4 doz.
Coleman	Polylite Cooler	Cooler, quantity: 6
Igloo	Playmate	Cooler, quantity: 10
Blue Ice	--	quantity: 6 doz.
Slope Indicator	51453	Static Water Level Meter
Sears	36	Batteries, 12 Volt Wet Cell, for Isco Samplers, quantity: 5
Isco	1392	Automatic Composite Sampler
	1580	Automatic Composite Sampler
	1580	Automatic Composite Sampler
	1580	Automatic Composite Sampler
	1580	Automatic Composite Sampler
	1580	Automatic Composite Sampler
Isco	1680	Automatic Sequential Samplers
	1680	Automatic Sequential Samplers
	1680	Automatic Sequential Samplers
	1680	Automatic Sequential Samplers
Sigma Motor	6200	Automatic Sequential Samplers
	6200	Automatic Sequential Samplers
	WA-2	Automatic Sequential Samplers
ISCO	2130	Sampler
Wabash	--	10 amp Battery Charger
Sears	--	8 amp Battery Charger
Various	--	Bailers with ball valves, various sizes quantity: 6

FIELD EQUIPMENT (cont'd)

Manufacturer	Model	Description
Mine Safety Appliances	--	Personal monitoring Pumps, quantity: 8
Mine Safety Appliances	--	Calibration K:4, quantity:2
Mine Safety Appliances	--	Charger, quantity: 4
General Metal Works	2000H	High Vol Sampler for TSP Monitoring, quantity:7
SKC Inc.	224-17500	Personal Monitoring Pumps, quantity: 15
SKC Inc.	224-16	Calibration Kit, quantity: 3
SKC Inc.	--	Charger, quantity: 3

FIELD EQUIPMENT (Cont'd)

Item	Quantity	Description
Conductivity Meter	1	Beckman
pH Meters	2	Analytical Measurements
Recording Fathometers	2	*Vexilan, Raytheon*
Depth Finders	4	Ray Jefferson, Heathkit
Water Samplers	6	VanDorn
Water Samplers	2	Kemmer
Turbidity Discs	8	Secchi
Fish Scale Projector	1	Baush-Lomb
Microscope-Compound	2	Leitz
Microscope-Dissecting	2	Wild
Microscope-Inverted	1	Ziess
Microscope-Research	1	Leitz
Drill	1	CME-55, Truck Mounted Drill
Drill	1	CME-45, Truck Mounted Drill
Drill	1	B-40, Tracked "ATV" Mobile on J-5 Bombardier, with trailer
Boat	1	25' Steel Hull, with gas powered housting equipment with tri-pod for handling drilling tools or sampling equipment.
Boat	1	60' Tug, 200 HP
Barge	1	50' x 20' Spud barge, suitable for handling drill rig

=LEASED

FIELD EQUIPMENT, (Cont'd)

Item	Quantity	Description
Barricade	2	Including flashers and night reflectors
Waders	2	Chest Height
Coveralls	25	Cotton and plastic
Hard Hats	10	Plastic
Respirators	6	Full Face
Safety Goggles	25	With side shields
Sampling Vessel	1	MonArk, 21', heavy duty aluminum work boa power winches, booms, depthfinders, VHF-F marine radio, twin 85 HP
Sampling Vessel	1	Lowe Line "AIRBOAT", aluminum flat-bottom full safety cage, aircooled auto engine-airplane propeller
Sampling Vessel	1	Alumacraft-electrofishing, 14 ft., safety railings, underwater illumination, 25HP
Sampling Vessel	1	Boston Whaler, 13 ft., runabout fiberglas 10HP
Sampling Vessel	1	Meyers-pram, 8 ft., aluminum electric mot
Sampling Vessel	1	Raft, 7ft., rubber, oars
Sampling Vessel	1	Steel Hull, 40 ft., trap net boat, diesel
Sampling Vessel	1	Steel Hull, 38 ft., tug, diesel
Sampling Vessel	1	Steel Hull, 32 ft., tub, diesel
Sampling Vessel	1	Steel Hull, 30 ft., harbor patrol boat, twin V-8
Sampling Vessel	1	Cruiser, 24 ft., 120 HP, I-O
Sampling Vessel	1	Military type transport-thrusters, 20 ft.
Sampling Vessel	1	Pontoon, 20 ft., 40 HP
Sampling Vessel	1	Runabout, 18 ft., 50 HP

* LEASED

FIELD EQUIPMENT (Cont'd)

Item	Quantity	Description
Radio tracking	1	For Fish Migration Studies
Electroshockers	5	Boat Mounted
Electroshockers	3	Backpack
Gill Nets	24	Experimental type
Hoop Nets	10	½" and 1" bar mesh
Seines	12	10' through 100', Bag
Otter Trawls	4	16 foot
Minnow Traps	8	
Trash Pumps	2	350 gpm, Gasoline
Flow Meters	18	General Oceanics
Nets, ½ m	10	505 u
s, ½ m	6	362 u
Nets, 1 m	3	1 mm
Bottom Sleds	5	
Dble. Net Supports	3	
Dredges	4	Ponar, regular
Dredges	1	Ponar, petite
Dredges	2	Ekman
Nets	6	D-frames
Nets	8	Drift
Wash Buckets	6	#30 mesh, Wildco
D.O. Meters	4	Yellow Springs Instrument
Thermistors	4	Montedoro-Whitney

(517) 349-2311
1478 W. Grand River • Okemos, MI 48864

October 7, 1986

E-Tech, Inc.
70 Dean Knauss Drive
Narragansett, RI 02882-1443

ATTN: Bill Fanning

Dear Bill:

As per your request, here is a list of the type and number of pieces of equipment and available manpower that we presently have at Ever-Clean, Inc.

1- 200 gallon tank truck
4- licenced transport trucks
5- men

Sincerely,

Allen D. Gray
President

HARMEYER CONSTRUCTION
RFD 1
Genoa, Ohio 43430
Contact - Dick Harmeyer
Phone Day 419-855-8378 Night MOB JS 42388

PUMP

Pumps Assorted Type & Sizes ID Number 00363
Number of Units Unit Weight Lbs
Pumping Capacity GPM Total Weight Lbs
Pump Storage Gals Prime Mover Gasoline
Hose Fittings In Number of Hoses
Pumping Head feet Explosion Proof - No
Hose Size in Hose Length

VACUUM/PUMPER TRUCK

Vacuum Truck 5000 Gal ID Number 00364
Number of Units 1 Storage Capacity 5000 Gal
Pumping Capacity 150 GPM

BEACH CLEAN-UP EQUIPMENT

Backhoe 500 lb ID Number 00374
Number of Units 1
Comments

Crane, American 35 Ton ID Number 00377
Number of Units 1
Comments

Beach Clean-Up Equipment

Dozer D-7 ID Number 00369
Number of Units 2
Comments

Dozer D-8 ID Number 00370
Number of Units 4
Comments

Dozer D-9 ID Number 00371
Number of Units 1
Comments

Dozer TD-8 ID Number 00372
Number of Units 2
Comments

Dozer 280 Michigan ID Number 00373
Number of Units 1
Comments

Dump Truck, Tandam 10 yd ID Number 00381
Number of Unirs 5
Comments

October 1, 1986

Mr. Bill Fanning
Research Engineer
E-Tech Inc.
70 Dean Knauss Drive
Narragansett, RI 02882-1443

Dear Mr. Fanning:

This is in response to your September 26, 1986 letter requesting information about International Technology Corporation's (IT) capabilities with regard to hazardous waste cleanup and transportation. IT has 39 offices and over 2,000 qualified professionals in the United States. The IT Engineering Services group includes approximately 600 scientists and engineers in 35 different disciplines encompassing every facet of environmental management. Among the engineering services we provide are:

- Engineering project management
- Site assessments, remedial investigations, and feasibility studies
- Modeling of contaminant transport from hazardous waste sites
- Geotechnical engineering design of remedial action alternatives
- Underground storage tank management
- Thermal treatment engineering
- Support to remedial action construction projects
- Drilling and well injection engineering services
- Definition of hazardous waste solutions
- Nuclear and mixed waste management engineering
- Emergency response
- Industrial and marine decontamination
- Occupational safety and health instruction

Analytical services are provided through a network of EPA and AIHA-approved laboratory facilities nationwide which give IT the largest commercial laboratory analysis capability in the U.S. We also have mobile laboratories which make it possible for personnel to conduct effective sampling and analysis at client plant sites in remote areas of activity.

Regional Office
IT Corporation • One Park Plaza • 11270 West Park Place • Suite 700 • Milwaukee, Wisconsin 53224-3692 • 414-359-2222

The IT transportation division includes one of the largest fleets of DOT-approved vacuum tank vehicles in the United States. All trucks and associated mobile equipment are built to the specifications of the ASME code. IT also offers a variety of waste treatment, recovery and disposal alternatives at locations throughout the state of California. The Corporation owns and operates facilities for acid neutralization, solvent recovery, chemical oxidation, biodegradation, solar evaporation and secure landfill.

I hope this listing of our services meets your needs with regard to the report you are preparing under the sponsorship of the U.S. Army Corps of Engineers, Detroit District. Please feel free to contact me if you need further information.

Sincerely,

Michael J. Farrell
Manager, Project Administration

MJF/lgh

:Ll

KEN GILL CONSTRUCTION
2124 Sand Rd
Pt Clinton, Ohio 43452
Contact: Ken Gill
Phone Day 419-732-3488 Night 419-732-3488

Pump
Pump Crisafulli 12 in PTO ID Number 00398
Number of Units 1 Unit Weight 300 lbs
Pumping Capacity 1500 GPM Total Weight 300 lbs
Pump Storage Gals Prime Mover Diesel
Hose Fittings .12 in Number of Hoses 1
Pumping Head 10 feet Explosion Proof No
Hose Size in Hose Length 50'

Pump, Homelite Trash 385 GPM ID Number 00397
Nunber of Units 2 Unit Weight 50 lbs
Pumping Capacity 385 GPM Total Weight 100 lbs
Pump Storage Gals Prime Mover - Gasoline
Hose Fittings 3.00 in Number of Hoses 1
Pumping Head 20 feet Explosion Proof - No
Hose Size 3.00 in Hose Length 20

Crane C-35 Shield Bantam 5 Ton Clam ID Number 00391
Number of Units 1
Comments 3/8 Yd Clam and Dragline 45 ft Boom

Dozer TD-8 International ID Number 00392
Number of Units 1
Comments 6 Way Blade

Dump Trucks Tandem ID Number 00395
Number of Units
Comments

Grader 503 Galion ID Number 00394
Number of Units 1
Comments

Hydraulic Excavator, 40EC Drott ID Number 00396
Number of Units 1
Comments

Loader Backhoe 580 ID Number 00393
Number of Units 1
Comments

Loader, 941 Caterpillar Crawler ID Number 00390
Number of Units 1
Comments

Trailer Low Boy with Tractor ID Number 00399
Number of Units 1
Comments Trailer Capacity 25 Tons Net

Trailer 5th Wheel ID Number 00400
Number of Units 1
Comments - Capacity 10 Tons Net Unit Has Truck

Received
10 Nov 86
E-Tech

LAKEHEAD PIPE LINE COMPANY, INC.
Manistique

GD4-58

March 24, 1986

D.D. Burley
Lakehead Pipe Line Co., Inc.
119 North 25th Street East
P.O. Box 789
Superior,Wisconsin

Dear Mr. Burley:

The foliowing is a list of pumps on inventory at the Manistique warehouse.

1 - High pressure skid mounted gas operated (Gaso)

1 - Low pressure 6" crose diesel on skids

1 - High pressure 1¼" Barnes jet pump

1 - Low pressure gas operated - centrifugal trash pump 2"

1 - Low pressure gas operated centrifugal trash pump 3"

1 - Low pressure gas operated diaphragm 3"

1 - Sand Piper 3" air operated double diaphragm (Heavy)

1 - 3" air operated Ingersol Rand submersible

Very truly yours

R.J. Burnis
Pipeline Foreman

RJB/lab

LEAK EQUIPMENT

DISTRICT #4

DESCRIPTION	SEC. I IRONWOOD	SEC. II MANISTIQUE
DJ-B Dozer; backhoe	--	1
Truck tractor; diesel, 5th wheel	1	1
Hyster low boy with collapsible goose neck	--	1
Low boy for truck tractor - goose neck type	1	1
Low boy with emergency equipment	--	2
Leak Van	1	1
Truck; 2-ton, oil rig bed	1	1
Truck; 1-ton, 4-wheel drive, welding equipment	2	2
Bombardier w/tri axle trailer	1	--
Hydraulic crane	1	1
Maxi-lite, diesel	1	1
Tractor; diesel, sideboom & dozer (*D7 or D8)	--	1
Tractor; diesel, backhoe & dozer, crawler	1	1
Vacuum Truck, 35 Bbl. capacity	--	1
Wach saw	1	1
Welding machine; spare	1	--
Portable generator; 1500 watt	1	1
Air compressor	1	1
Pump; high pres., skid-mounted, gas engine (Gaso)	1	1
Pump; low pres., gas engine, 1½" centrifugal	--	1
Pump; low pres., gas engine, 3" centrifugal	2	--
Pump; low pres., gas engine, 3" diaphragm	2	1
Pump; 3" air operated diaphragm	1	1
Pump; low pres., 2" trash, centrifugal	1	1
Pump; low pres., 3" trash, centrifugal	1	1
Pump; 3" air sand piper	--	1
Pump; 6" Crose diesel on skids	--	1
Pump; submersible, air driven, 3" centrifugal	2	1
Hose; suction/discharge, size for above pumps	1 lot	1 lot
Pipe; 3" aluminum (fittings & adapters available)	--	460 ft.
Pipe; 4" aluminum (fittings & adapters)	460 ft.	480 ft.
Boat; 16 ft. aluminum w/outboard motor & trailer	1	1
Trailer; side tilt, two-wheel	--	1
Equipped with: 6" fin depth boom	--	400 ft.
Trailer; Walls Cargo	1	1
Equipped with: 6" fin depth boom	500 ft.	610 ft.
4" plastic hose w/floats & clamps	100 ft.	75 ft.
1½" nylon hose	300 ft.	300 ft.
Pump; floating, skimmer	1	2
Pump; floating, fire-fighting	1	1
Absorbent pads (cartons)	20	20

L. S. Snyder and Son Inc.
4811 Muggy
Port Clinton, Ohio 43458
Contact BOB or Jim
Phone Day 419-797-2286 Phone Night

Beach Clean-Up Equipment

Backhoes 580 Case ID Number 00415
Number of Units 2
Comments 1 1/2 Yd Bucket

Backhoe, Drott ID Number 00416
Number of Units 1
Comments 1 yd bucket on tracks

Crane, P&H 10 Ton ID Number 00417
Number of Units 1
Comments 50 ft boom with bucket

Dozer TD8 International ID Number 00410
Number of Units 1
Comments 8 ft Blade

Dozer, D5 Cat ID Number 00409
Number of Units 1
Comments 10 ft blade

Dump Trucks, Tandem ID Number 00413
Number of Units 5
Comments

Endloader 920 Cat ID Number 00411
Number of Units 1
Comments 1 3/4 yd bucket on rubber tires

Endloader 951 Cat ID Number 00412
Number of Units 1
Comments 1 3/4 Yd bucket on tracks

Grader, Wabco ID Number 00414
Number of Units 1
Comments 12 ft blade

MPC MARINE POLLUTION CONTROL
8631 WEST JEFFERSON • DETROIT, MICHIGAN 48209 • 313/849-2333 • TELEX 23-0387

EQUIPMENT AND MATERIALS LIST

Vacuum Tankers

- 5,000 gal. Diesel tractor/trailer, hoist body, dump door
- 6,000 gal. Diesel tractor/trailer, stainless (MC 312)
- 3,000 gal. Vacuum truck, hoist body, dump door
- 2,000 gal. Vacuum truck (coded DOT 306, 307, 312)
- 1,800 gal. Vacuum truck
- 250 gal. Mobile vacuum unit (trailerable)

Tanker Trailers

- 4,300 gal. tank trailers (2)
- 7,000 gal. tank trailers (2)
- 6,200 gal. stainless steel (coded DOT 307)
- 5,000 gal. stainless steel (coded DOT 307, 312)
- 5,000 gal. stainless steel (coded DOT 307)
- 6,500 gal. stainless steel (coded DOT 307)

Trucks/Trailers

- Hazardous Material Response Trailer (40' van with inventory of sorbents, booms, recovery barrels, command and communications center)
- 16' Stake
- 12' Stake, with hose supply
- Operations vehicles (7)
- Mechanics Van
- All-terrain vehicle
- Flatbeds (4) (with tarp covers)
- Emergency Air Supply Van
- Tractors (4) (2 equipped with gear pumps)
- 20 yard Rolloff boxes (14)
- Roll on/rolloff trailers (3)

Misc. Equipment

- Front-end loader and backhoe
- 175 CFM air compressor
- 14' Mobile office trailer
- 22' Personnel decontamination trailer
- Mobile Lighting units, 5,000 watts, 16' and 26' towers
- Tripod, 3,000 watts capacity
- Miscellaneous portable generators (3)
- Remote hazardous drum opener (SAF-T-PUNCH)
- Portable drum crusher (SAF-T-CRUSH)
- Field lab sampling equipment

APRIL, 1986

MPC™

High Capacity Pumping Systems

3,000 (TK6), 1,300 gpm Centrifugal pumps (ADAPTS)
1,600, 2,250 gpm pumps (CCN-150)
(Complete with self-contained diesel-hydraulic powerpack systems and capable of 180' head)
10 units are located at Detroit, Michigan; Seattle, Washington; Robbinsville, N.J.; New Orleans, Louisiana; Aberdeen, Scotland; and Hong Kong

Pumps

2" Centrifugal (4)
2" Diaphragm air (2)
3" Diaphragm air (2)
4" Centrifugal (3)
1.5" Centrifugal
4" Marco (2)
4" TK4 (Stainless)
6" Submersible hydraulic (11) (Aluminum, NiAl Bronze and stainless)
Single/double stage submersible hydraulic
Stainless steel air driven barrel pump
Stainless steel diaphragm air

Auxiliary Equipment

Steam jennies (2)
Power washer
Mobile power washer (250 gal.)
2,500 psi water blaster
Electric low pressure/low volume washer
Cutting torches
Lamb air movers
MSA explosive meters
MSA self-contained breathing systems
Canister masks
Comfo II chemical respirators
Line throwing guns
Air chippers and hammers
Cameras
Discharge mill hoses, assorted sizes
Truck mounted spray bars
Suction hoses, assorted sizes
Oil containment booms (2000 feet)
SCAVENGER groundwater decontamination unit
EMTEX groundwater decontamination unit
Absorbent booms (1000 feet)
Grip hoists
Chain falls
Diving gear
Non-sparking tools
Underwater tools
Cuno filtering system (5 micron)
Complete air cascade breathing system
Saranex Tyvek suits

MPC

Hazardous Materials

Recovery drums
Fully encapsulated air suits (Acid King & Eastwind) (5)
Bio pack 60 air supply (2)
Wilson ambient air breathing system (1)
MSA disposable air suits
Eastwind acid suits (2)
Comset phone for communication to full air suit

BUDA II Vacuum Barge

40' x 10'
Capable of transport by air, rail or trailer truck
Diesel self-propelled
Skimming capability of 3,000 gallons per hour
with 1" depth of product
4000 gallon storage capacity
3" vacuum pump
Two skimmer adapters
15kw diesel generator
12' x 20' debris hauling space and debris catcher
Marine radio
Fire fighting equipment (3 gun monitor. Foam, spray and straight stream)

BUDA I Work Barge

36' x 12'
Outboard powered, marine radio, 4000 gallon storage. (capable of transport by rail or truck)

Outboard Utility Boats

17' Boom boats with
Marine radios
Outboard motors (2)

12' John boats with
Outboard motors (6)

15' Equipment rafts with
Outboard motors (2)

Communication Equipment

Telex, Detroit No. 23-0387
Tele: (313) 849-2333 and (800) 521-8232
Walkie-talkies (12)
Mobile marine radios (7)
Video tape recorder, camera, monitor
Cassette recorders
Cameras
Facsimile machine (313) 849-1623

MPC™

Auxiliary Services

- Lab facilities to determine B S & W, viscosity and flash points of petroleum products
- Consultants
- Organic chemist
- Inorganic chemist
- Qualified military-trained divers
- Staff pilot

Distributor of:

- Fiberperl sorbents: booms, bags, pillows
- 3M sorbents: booms, pillows, pads, sweeps
- Oil dispersent
- Acme boom
- Uniroyal boom
- SPC sorbents
- Acme oil skimmers
- Slickbar products
- EMTEC groundwater recovery/cleanup systems
- NEPCCO groundwater recovery/cleanup systems

SPILL CLEAN-UP INVENTORY - Zone III

McCullough Contruction Inc
~~801 State St~~ 2435 Gill Rd
Port Clinton, Ohio 43452
Day 419-734-5533 Night 419-732-2706

PUMP

Pump ID Number 00425
Number of Units 2 Unit Weight lbs
Pumping Capacity GPM Total Weight lbs
Pump Storage Gals Prime Mover Gasoline
Hose Fittings 1.50 in Number of Hoses 1
Pumping Head feet Explosion Proof No
Hose Size 1.50 in Hose Length

Pump, 2 in ID Number 00426
Number of Units 1 Unit Weight lbs
Pumping Capacity GPM Total Weight lbs
Pump Storage Gals Prime Mover - Gasoline
Hose Fittings 2.00 In Number of Hoses 1
Pumping Head Feet Explosion Proof No
Hose Size 2.00 In Hose Length

Pump Crisafulli 10300 GPM ID Number 00429
Number of Units 1 Unit Weight lbs
Pumping Capacity 10300 GPM Total Weight lbs
Pump Storage Gals Prime Mover Diesel
Hose Fittings 16.00 In Number of Hoses
Pumping Head Feet Explosion Proof No
Hose Size 16.00 in Hose Length

Pump, Gorman Rup 325 GPM ID Number 00427
Number of Units 1 Unit Weight lbs
Pumping Capacity 325 GPM Total Weight lbs
Pump Storage Gals Prime Mover Gasoline
Hose Fittings 3.00 in Number of Hoses
Pumping Head feet Explosion Proof No
Hose Size 3.00 In Hose Length

Pump, JAGER 550 GPM ID Number 00428
Number of Units Unit Weight LBs
Pumping Capacity 550 GPM Total Weight LBS
Pump Storage Gals Prime Mover Gasoline
Hose Fittings 4.00 In Number of Hoses
Pumping Head ft Explosion Proof No
Hose Size 4.00 In Hose Length

McCullough Construction Co.(Cont)

Beach Clean-Up Equipment

Backhoe, Case 480 CK — ID Number 00441
Number of Units 1
Comments 3/4 yd front loader,Auger Attachment

Backhoe, Case 580-C — ID Number 00440
Number of Units 1
Comments - 1 yd front loader, Hoe Bucket 12",18",24"

Backhoe,Ford 4500 — ID Number 00442
Number of Units 1
Comments 3/4 yd front loader, Hoe 18",24",30"

Crane, Bucyrus Erie 30-B 25 ton — ID Number 00430
Number of Units 1
Comments 70 ft Boom 11/2 yd dragging or clamshell

Crane, Hanson, 454 10 ton Crawler — ID Number 00433
Number of Units 1
Comments 40' Boom 1/2 yd dragline or clamshell

Crane, Link Belt LS-68 15 Ton — ID Number 00432
Number of Units 1
Comments - 45' Boom, 518 yd dragline or clamshell,crawle

Crane, Lorain MC 254 15 Ton Tires — ID Number 00434
Number of Units 1
Comments 70' pin boom 20' jib

Crane, Northwest 25 D 18 Ton, crawler — ID Number 00431
Number of Units 1
Comments 55 Ft Boom, 314 Yd dragline or clamshell

Crawler Loader Caterpiller 941 — ID Number 00438
Number of Units 1
Comments 13/4 yd bucket 4 in 1 bucket & ripper

Crawler Loader Caterpiller 955 — ID Number 00437
Number of Units 1
Comments 13/4 yd Bucket

Dozer, Caterpiller D-6C — ID Number 00435
Number of Units 1
Comments

McCullough Construction Co. (Cont)

Beach Clean-Up Equipment

Dozer, International 500 C 347 ID Number 00436
Number of Units 1
Comments 6 way blade

Dump Truck International 6 Cu Yd ID Number 00444
Number of Units 1
Comments: Single Axle

Dump Trucks Ford 10-14 Cubic Yd. ID Number 00445
Number of Units 4
Comments - Ford 8000 2-800, 1 T850

Grader, Caterpillar 112 ID Number 00439
Number of Units 1
Comments

Scraper, Selfloading, John Deere 760 ID Number 00443
Number of Units 1
Comments - Elevating Scraper, 10 yd capacity

Barge

Barge 24 x 40 x 4 ID Number 00446
Number of Units 2 Pumping Capacity GPM
Draft Loaded Feet Draft Unloaded Feet
Storage Capacity
Auxiliary Equipment - SPUP Well, Equiped for Dragline or Clamshell

Barge 7 x 34 x 5 ID Number 00448
Number of Units 1 Pumping Capacity GPM
Draft Loaded Feet Draft Unloaded Feet
Storage Capacity
Auxiliary Equipment 5 Air Tight Compartments, 200 Gal Fuel Tank

Barge 15 x 8 x 2 ID Number 00447
Number of Units 1 Pumping Capacity GPM
Draft Loaded feet Draft Unloaded Feet
Storage Capacity
Auxiliary Equipment

Generator

Generator 3500 Watt ID Number 00449
Number of Units 1 Power Output 3 Kilowatts
Number of Outlets 4 Available Cable Ft
Explosion Proof Lights Watts
Power Requirements - Gasoline

McCullough Construction Co (Cont)

Other

Pickup Truck 3/4 Ton — ID Number 00450
Number of Units 6
Comments

Trailer- Nelson 20 Ton Lowboy — ID Number 00452
Number of Units
Comments

Trailers 10-24 Ft Home Made — ID Number 00454
Number of Units 4
Comments 1-16' Tri Axle, 1-20' 4 Axle, 1-10' Single

Trailer,Anthony - Semi Dump R1-60 — ID Number 00453
Number of Units 1
Comments:20 Cu Yd W/Mack Tractor R600 Diesel

Welding Truck 1 ton — ID Number 00451
Number of Units 1
Comments

MORAVY TRUCKING CO.

1934 Commercial Drive - Mt. Pleasant, Michigan - 48858 - (517) 773-6971

Equipment Schedule & Price List
(Effective March 3,1984 - Revised March 3,1986)

UNIT NO.	EQUIPMENT DESCRIPTION	$
012	Single Axle Gin Pole Truck	
018	" " " " "	
024	4X4 Auger Boring Truck	
026	Single Axle 5 yd. Dump Truck	
013	Tri-Axle 65 bbl. Vacuum Truck	
015	" " " " "	
020	" " " " "	
023	" " " " "	
016	Tandem Axle Truck-Tractor w/winch	
021	" " " " "	
022	" " " " "	
025	" " " " " & wet lines	
027	" " " " w/wet lines	
506	Pole Trailer	
507	" "	
514	" "	
515	Tank Carrier Trailer	
522	Tri-Axle Tag-Along Trailer	
517	40' Flat Trailer w/removable sides	
519	36' Tri-Axle Float Trailer	
520	" " " "	
521	42' " Lobey Trailer	
523	24' Tri-Axle Dump Trailer	
524	" Quad-Axle Dump Trailer	
101	1/2 T Pickup w/snowplow	
123	3/4 T " w/monorail 4X4	
124	1/2 T "	
125	1/2 T "	
126	3/4 T " 4X4	
301	530 Case Tractor/Backhoe/Loader	
302	450 " " /Dozer w/Buzy Blade	
303	580 " " /Backhoe/Loader	
901	Standard Labor	
905	Supervisor	
906	Per Diem/overnight	

Notes:
* All rates based on time equipment leaves our yard until it returns.
* All equipment rates include operator.
* All hourly rates subject to two hour minimum.
* Vacuum truck rates include 60' hose per unit.
* Additional charge of $9.50/hr [illegible] maintenance vehicle.

MISCELLANEOUS EQUIPMENT

Fluid Storage Tanks:
250 bbl. horizontal skid tank - 1st 5 days -
or 70 bbl.open top pit tank per day after
per month (2 mo. min.)

Subsurface Oil Recovery Units:
Shallow Well (to 12' depth)
Deep Well

Slickbar Oil Boom Unit - Flat charge plus rental
(in 100' increments) Days 1-5
" 6-10
" 11-15
Thereafter

Oil Skimmer Head
Suction/Discharge Hose: 2",2½",3" per 50 ft.
Chain Saws, String Trimmers, Blowers, etc.: per ea.
Centrifugal Pumps: Gas 2",3"
Diesel 3"
Generators/Flood Lights
Respiratory Protection
Emergency Air Pack
Air Compressor
Protective Clothing, Boots, Waders, Slickers,etc.
Environmental Response Unit
12' Boat & 3 hp motor
14' " " 7 " "
16' " " 75hp "
Tractor w/brush hog
All disposal & subcontract charges

Note: All above equipment subject to clean-up & repair charges.

M. PETTY & SONS
~~653 Hillard Ave~~
~~Oregon, Ohio 43616~~
Contact - ~~J. Hodgson, Night~~ Mark Petty
Phone Day ~~419-693-5878~~ ~~Night 419-847-8883~~
~~[illegible]~~ 419- 698-8433

RIVER/HARBOR BOOM

Boom Uniroyal 8 x 10 50' per unit — ID Number 00156
Number of Units 12 — Unit Length 50 feet
Boom Draft 10 inches — Total Length 600 feet
Free Board 8 inches
Current Limit - Between 1.1-1.5 Knots
Sea State Limit - Less than 1 ft
Other Characteristics
Auxilary Equipment

SORBENT

Corn Cobs — ID Number 00159
Number of Units — Unit Weight Lbs
Total Weight 2000 lbs — Sorbent Type Vegetable
Form - Loose — Application Ratio

Straw — ID Number 00160
Number of Units 15 — Unit Weight 50 lbs
Total Weight 750 lbs — Sorbent Type Vegetable
Form Bales — Application Ratio

M. PETTY & Son (cont)

3M Type 156 Sorbent Pads — ID Number 00158
Number of Units 10 — Unit Weight 20 lbs
Total Weight 200 lbs — Sorbent Type Synthetic
Form Bales — Application Ratio

3M Type 270 Sorbent Boom — ID Number 00157
Number of Units 10 — Unit Weight 47 lbs
Total Weight 470 lbs — Sorbent Type Synthetic
Form Bales — Application Ratio

TRANSFER/LIGHTERING SYSTEM

Tank Truck 5300 Gal — ID Number 00164
Number of Units 1 — Unit Weight lbs
Pumping Capaicity — 150 GPM Total Weight lbs
Pump Storage 5300 Gals — Prime Mover- Diesel
Hose Fittings 3.00 IN — Number of Hoses 1
Pumping Head feet — Explosion Proof Yes
Hose Size 3.00 In — Hose Length 40

Tank Truck 7200 Gal — ID Number 00165
Number of Units 2 — Unit Weight lbs
Pumping Capacity 150 GPM Total Weight — lbs
Pump Storage 7200 Gals — Prime Mover - Diesel
Hose Fittings 3.00 in — Number of Hoses 1
Pumping Head feet — Explosion Proof Yes
Hose Size 3.00 in — Hose Length 40

Tank Truck 8200 Gal — ID Number 00163
Number of Units 1 — Unite Weight Lbs
Pumping Capacity 150 GPM Total Weight — Lbs
Pump Storage 8200 gals — Prime Mover - Diesel
Hose Fittings 3.00 in — Number of Hoses 1
Pumping Head feet — Explosion Proof Yes
Hose Size 3.00 in — Hose Length 40

PUMP

Pump Air Operated — ID Number 00162
Number of Units 5 — Unit Weight lbs
Pumping Capacity 175 GPM Total Weight 5000 lbs
Pump Storage Gals — Prime Mover Diesel
Hose Fittings 4.00 in — Number of Hoses 1
Pumping Head 15 feet — Explosion Proof Yes
Hose Size 4.00 in — Hose Length 40

Pumps Air Operated — ID Number 00161
Number of Units 3 — Unit Weight 250 lbs
Pumping Capacity 175 GPM Total Weight 750 lbs
Pump Storage gals — Prime Mover Gasoline
Hose Fittings 3.00 in — Number of Hoses 1
Pumping Head 10 feet — Explosion Proof Yes
Hose Size 3.00 in — Hose Length 30

M. PETTY & Son (cont)

VACUUM/PUMPER TRUCK

Vacuum Truck 1600 — ID Number 00168
Number of Units 3 — Storage Capacity 1600 gals
Pumping Capacity 100 GPM

Vacuum Truck 3000 Gal — ID Number 00166
Number of Units 1 — Storage Capaicty 3000 gals
Pumping Capacity 100 GPM

Vacuum Truck 3360 Gal — ID Number 00167
Number of Units 1 — Storage Capacity 3360 gals
Pumping Capacity 100 GPM

BEACH CLEAN-UP EQUIPMENT

Backhoe 580 Case — ID Number 00174
Number of Units 1
Comments

Backhoe 880 Case — ID Number 00173
Number of Units 1
Comments

Crane 24 Lima 10 ton — ID Number 00178
Number of Units 1
Comments 3/4 yard Clam Shell

Crane 350 Bannum 7 ton — ID Number 00176
Number of Units 1
Comments 3/8 Yard Clam shell

Crane, Picker 14 Ton — ID Number 00179
Number of Units 1
Comments Grove Cherry Picker

Dozer D-6 Caterpiller — ID Number 00170
Number of Units 1
Comments

Dozer D-8 Caterpiller — ID Number 00169
Number of Units 1
Comments

Dozer 1150 B Case — ID Number 00171
Number of Units 1
Comments

M. PETTY & Son (cont)

BEACH CLEAN-UP EQUIPMENT

Dozer 850 Case — ID Number 00172
Number of Units 1
Comments

Dump, Trucks 15 Yard — ID Number 00180
Number of Un its 5
Comments

Earthmover — ID Number 00175
Number of Units 1
Comments 11 Yard

Endloader 2 Yard — ID Number 00182
Number of Units 1
Comments on Rubber Tires

ENDLOADER 3 yard — ID Number 00181
Number of Units 1
Comments - On Rubber Tires

Endloader 3/4 yard — ID Number 00183
Number of Units 2
Comments: on Rubber Tires

BOAT

Boat 16 ft Alum — ID Number 00184
Number of Units 1 Length 16 feet
Draft FT Horsepower 0020
Propulsion Outboard

Boat 18 ft Fiberglass I/O — ID Number 00185
Number of Units 1 Length 18 feet
Draft Ft Horsepower 0165
Propulsion Inboard (Single Screw)

Boat 18 Ft Fiberglass Outboard — ID Number 00186
Number of Units 1 Length 18 feet
Draft Ft Horsepower 0080
Propulsion Outboard

Boat 40 Ft Wood Facemaker — ID Number 00187
Number of Units 1 Length 40 feet
Draft ft Horsepower 0400
Propulsion Inboard (Twin Screw)

M. PETTY & SON (Cont)

COMMUNICATIONS EQUIPMENT

Radio Mobile
Number of Units 5
Equip Type UHF
Range 20

ID Number 00189
Frequency/Channel 463.400
Power Source DC
Radio Call Sign KX 9666

Radio Motorola Base
Number of Units 1
Equip type UHF
Range 40

ID Number 00188
Frequency/Channel 468-400
Power Source AC
Radio Call Sign WBS5641

Radio Motorola Portable
Number of Units 3
Equip Type UHF
Range 5

ID Number 00190
Frequency/Channel 463.400
Power Source -Battery Pack
Radio Call Sign KX 9666

SAFETY EQUIPMENT

MSA Air Packs
Number of Units 4
Comments 4 Extra Air Bottles

ID Number 00191

GENERATOR

Generator Light Plant
Number of Units 2
Number of Outlets
Explosion Proof Lights
Power Requirements - Gasoline

ID Number 00195
Power Output Kilowatts
Available Cable Ft
Watts

Generator 10 KW
Number of Units 1
Number of Outlets 4
Explosion Proof Lights 500 Watts
Power Requirements - Gasoline

ID Number 00194
Power Output 10 Killowatts
Available Cable 200 feet

Generator 3500 Watts
Number of Units 1
Number of Outlets 4
Explosion Proof Lights 500 Watts
Power Requirements - Gasoline

ID Number 00192
Power Output 3 Kilowatts
Available Cable 100 ft

Generator 5000 Watts
Number of Units 1
Number of Outlets 4
Explosion Proof Lights 500 Watts
Power Requirements Gasoline

ID Number 00193
Power Output 5 Kilowatts
Available Cable 100 ft

M. PETTY & SON (Cont)

OTHER

Trailer Low Box — ID Number 00197
Number of Units 1
Comments

HANS HANSON WELDING
2824 Summit Street
Toledo, Ohio 43611
Contact
Phone Day 419-729-1629 Night 419-729-1621

BARGE

Barge 30 x 10 x 3 — ID Number 00010
Number of Units 1 — Pumping Capacity GPM
Draft Loaded Feet — Draft Unloaded Feet
Storage Capacity
Auxiliary Equipment

Barge 30 x 15 x 2 — ID Number 00008
Number of Units 1 — Pumping Capacity GPM
Draft Loaded Feet — Draft Unloaded Feet
Storage Capacity
Auxiliary Equipment

Barge, Work Type 20 x 14 x 2 — ID Number 00006
Number of Units 1 — Pumping Capacity GPM
Draft Loaded Feet — Draft unloaded Feet
Storage Capacity
Auxiliary Equipment

Barge, Work 50 x 32 x 4 — ID Number 00009
Number of Units 1 — Pumping Capacity GPM
Draft Loaded Feet — Draft Unloaded Feet
Storage Capacity
Auxiliary Equipment

Barge, Work Type 20 x 12 x 2 — ID Number 00007
Number of Units 1 — Pumping Capacity GPM
Draft Loaded Feet — Draft Unloaded Feet
Storage Capacity
Auxiliary Equipment

BOAT

Boat 40 Ft — ID Number 00011
Number of Units 1 — Length 40 feet
Draft Ft — Horsepower 0250
Propulsion Inboard (Single Screw)

NATIONAL
INDUSTRIAL MAINTENANCE, INC.
Specializing in today's needs for environment protection.
4530 Baring Avenue • East Chicago, IN 46312-0209 • (219) 398-6660

October 7, 1986

EQUIPMENT & PERSONNEL LIST

EQUIPMENT

3 - Vacuum Trucks - Liquid - 3000 gallon capacity
2 - Vacuum Trucks - Liquid - 5500 gallon capacity
7 - Hydro Jet Truck - 1600 PSI, 65 GPM
6 - Combination Hydro Jet & Vactor Truck - 2000 PSI, 65 GPM, 8 yard capacity
1 - Pickup Truck with Chemical Foaming Machine
4 - Pickup Truck with miscellaneous hand tools
2 - Pickup Truck with mounted Steam Cleaner
6 - Pcikup Truck with portable Sewer Cleaning Equipment
6 - Tractor with 6500 gallon Oil Tanker with Transfer Pump
30 - Support Vehicles
17 - Dry/Wet Bulk Vacuum Truck

TRAILER UNITS

6 - Air Compressors
2 - Air Compressor/Blower
3 - Air Compressor/Impact Wrench
2 - Air Compressor/3" Pump
20 - Waterblaster, 10,000 PSI, 25 GPM
2 - High Pressure Agitation Pump, 1200 GPM, 150 HP Diesel Engine, 8" intake capable of pumping long distances
1 - Oil Skimming Boat
12 - Sewer Bucketing Machines
1 - Environmental Trailer - includes the following equipment: Emergency Air Pack, two (2) Air Masks with 300' of Air Hose, Safety harnesses with 500' of Rope, Battery Powered Lights (Explosion Proof), Portable Shower, 500' Fire Hose, First Air Kit, Disposable Clothing, Miscellaneous Testing Devices such as Oxygen & Combustible Tester, H2S Tester, and Lead-in-Air Tester

MISCELLANEOUS

2 - John Boats with motor
2 - Portable Generator (3000 kw)
2 - Portable Generator (7500 kw)
1 - Portable Generator (15000 kw)

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October 7, 1986

EQUIPMENT & PERSONNEL LIST

MISCELLANEOUS CON'T.

6 - Trash Pumps 3"
2 - Trash Pumps 6"
2 - Electric Trash Pumps 8"
2 - Electric Trash Pumps 10"

PERSONNEL

4 - Supervisors
12 - Foremen
35 - Leadmen
50 - Helpers

OHM's large quantity of hazardous materials handling, treatment, and analytical equipment is company owned and represents our strong corporate commitment to provide quality environmental services. In order to meet the demands for emergency response, OHM has developed a large maintenance and fabrication department with a mission to keep our equipment job-ready and to modify or fabricate specialized recovery and treatment equipment.

CORPORATE EQUIPMENT LISTING

VACUUM EQUIPMENT

2	3,500-gallon Vacuum Trucks
1	2,000-gallon Vacuum Truck
1	1,800-gallon Vacuum Truck
17 ~~14~~	1,500-gallon Vacuum Units

TRUCKS AND TRAILERS

13 ~~11~~	Over-the-road Diesel Tractors
13 ~~12~~	Pollution Control Equipment Trucks
6	Four-wheel-drive Vehicles
~~11~~	One-ton Trucks
23	Two-ton Trucks
70 ~~57~~	Pickup Trucks/Vans
57	Cars
15	Decontamination and Equipment Trailers
2	5,000-gallon Stainless-steel Tanker Trailers
20	Lowboy Trailers, Gooseneck Dolly Trailers
2	Flatbed Trailers
3	Crew Trailers
4	Office Trailers with Accessories
7	Box Trailers
1	Bomb Trailer
3	Personnel Decontamination Trailers
1	Transfer Equipment Trailer

BREATHING EQUIPMENT

50	Self-contained Breathing Apparatus (High Pressure) with Two Spare Bottles
100	150-lb Cylinders Breathing Air
60	Self-contained Breathing Apparatus (Low Pressure) with Two Spare Bottles
100	Cascade Refilling Systems (Survivair Egress Needs Special Adaptor to Fill with Air)
100	Scott Ska-Pak Emergency Escape Units with Spare Bottles or Survivair Egress Units with Spare Bottles
40	100-foot Lengths Breathing Air Hose
50	50-foot Lengths Breathing Air Hose
40	25-foot Lengths Breathing Air Hose
40	3-way Manifolds
100	Breathing-air Regulators
100	Spare Lens Scott Air Masks
300	Bottles MSA Antifog
100	Spare Lens Survivair Masks

RESPIRATORY PROTECTION EQUIPMENT

300	AO Full-face Respirators
25	Boxes R-30 Cartridges
200	Boxes R-51 Cartridges
200	Boxes R-53HE Cartridges
100	Boxes R-57A Cartridges
100	Boxes R-91A Cartridges
60	Exhalation Valve Flaps
240	Inhalation Valve Flaps
60	Exhalation Valve Flap Covers
120	Respirator Gaskets
75	Respirator Straps
150	Large Half-face Respirators
200	Medium Half-face Respirators
100	Small Half-face Respirators

PROTECTIVE CLOTHING

50	Fully Enclosed Chemical Suits
300	Medium Acid Jackets
300	Medium Acid Bibs
300	Large Acid Jackets
300	Large Acid Bibs
300	X-large Acid Jackets
300	X-large Acid Bibs
50	Acid Coveralls with Boots Attached
45	Acid Hoods
100	Dozen Acid Gloves
300	Plastic Rings for Acid Jackets

300	Rubber Rings for Acid Jackets
60	Acid Hood Lenses
60	Acid Bib Clips
75	Chemical Waders with Straps
142	Pairs Tingley Boots
100	Pairs Robar Boots
	20 Size 9
	20 Size 10
	20 Size 11
	20 Size 12
	20 Size 13
200	Medium Rain Gear
200	Large Rain Gear
200	X-large Rain Gear
100	Dozen 13-152 PVC Gloves
100	Dozen White Cloth Gloves
3,000	Pair Disposable Vinyl Boots
5,000	Large Disposable Suits
5,000	X-large Disposable Suits
1,000	Disposable Hoods
5,000	X-large Saran Suits
5,000	Large Saran Suits

HEAD AND EYE SAFETY EQUIPMENT

200	Goggles
200	Dust Proof Goggles
500	Hard Hats (Yellow) with Face Shield Brackets
500	Face Shield Brackets
1,000	Face Shields
100	Small Eye Wash Bottles
10	Large Encon Eye Wash
250	Tinted Face Shields

EXPLOSION PROOF EQUIPMENT

28	Brass Tool Boxes
10	Explosion Meters
50	Explosion Proof Flashlights
28	Brass Crow Bars 3-foot
45	Brass Bung Wrenches
28	Brass Sledges
28	24-inch Brass Pipe Wrenches
28	36-inch Brass Pipe Wrenches
30	Brass Shovels

GENERAL SAFETY EQUIPMENT

30	Oxygen Save-a-life
35	Hot Packs

35	Cold Packs
15	Stretchers
100	First Aid Kits
12	Showers (400 Gallons)
100	20-lb. Fire Extinguishers
75	Tubes SBS 46 Protective Cream
75	Tubes SRS 44 Protective Cream
25	Safety Harnesses

SAMPLING EQUIPMENT

120,000	Pairs Sample Gloves
75	Dozen 8-Ounce Glass Sample Jars with Lids
50	Dozen Pint Sample Jars with Lids
100	Dozen Quart Sample Jars with Lids
40	Rolls Sample Rope
100	Rolls Wide Range pH Paper
9	Portable Air Samplers (Draeger)
7	Rolls Sample Labels
15	Rolls Aluminum Foil
30	Aluminum Boxes (Sample Transfer with 2002 Lock)

RECOVERY AND TREATMENT EQUIPMENT

6	Pneumatic Recovery Systems
3	Compatibility Chambers
3	Heated Volatile Organic Sparging Units
1	100,000-gallon Portable Pool
10	50,000-gallon Portable Pools
65	12,000-gallon Portable Pools
9	Mobile Clarifiers with Sludge Collection
1	3-cell Mobile Activated Carbon Filtration Units
16	2-cell Mobile Activated Carbon Filtration Units
7	1-cell Mobile Activated Carbon Filtration Units
23	High-capacity Mixed-media Prefilters
9	Portable Buildings
1	Storitainer (Portable Storage Tanks)
11	Lightning Chemical Mixers

MOBILE ANALYTICAL EQUIPMENT

8	Analytical Laboratories
22	Gas Chromatographs
15	Gas Chromatograph Detectors (NPD, ECD, PID)
1	Thermal Conductivity Gas Chromatograph
15	Mobile Infrared Air Analyzers (MIRAN)
25	Personnel Air Sampling Pumps
2	Total Organic Carbon Analyzers
8	Flash Point Analyzers
2	Head Space Analyzers
3	Spectrophotometers (HACH)
4	Infrared Spectrophotometers

6	Sample Inlet Systems
5	Auto Samplers
10	Portable Air Samplers
4	Submersible Water Samplers (Bomb Type)
5	Atomic Absorption Units
7	Carcinogen Handling Units
1	Portable Flame Ionization Detection Monitor/OVA
3	Digital Pyrometers
4	Flow Calibration Units
2	Digital Diluters
5	Specific Ion Meters
2	Oxygen Meters
15	pH Meters
22	Photoionization Detectors
2	Bomb Calorimeters
16	Explosion Meters
5	Geiger Counters

BIOANALYTICAL EQUIPMENT

1	Bioactivation Vessel
1	Incubator
1	Colony Counter/Stereoscopic Microscope
1	Bacterial Membrane Filter System
2	Electrolytic Respirometers
1	Autoclave
3	Dissolved Oxygen Meters
1	Compound Microscope
1	Analytical Balance
1	U.V./Visible Spectrophotometer

CHEMICAL TRANSFER EQUIPMENT

1	Transfer Equipment Trailer
1	Hot Tap Machine
2	Nonsparking Tool Sets
1	Patch Kit
1500'	2-inch and 3-inch Chemical Transfer Hose
13	Chemical Transfer Pumps
2	Hydraulic Power Packs
10	2-inch, Stainless-steel, Double-diaphragm Pumps

CONSTRUCTION EQUIPMENT

1	18-ton Crane
2	Tandem Dump Trucks
3	35-foot Cat 225 Backhoes
7	30-foot Cat 215 Backhoes
3	955 Cat Loaders with 4-in-1 Bucket
14	17-Foot Ford 5500 Backhoes
1	D-3 Cat Dozer

3	D-6 Cat Dozers with Winch
2	Fork-lift Tractors
1	Field Tractor
7	Heavy Equipment Buckets
10	Forklift/Hard-tired
2	930 Cat Loaders with 2½-yard Bucket
4	Portable Drilling Rigs
4	Trailer-mounted Drill Rigs
1	Trencher Ditchwitch

LIGHTS AND GENERATORS

5	Light Plants, 5,000 Watt
100	Satellite Lights
1	150 KW Generator
1	50 KW Generator
1	30 KW Generator
2	15 KW Generators
3	10 KW Generators
4	6.5 KW Generators
17	5 KW Generators
1	2.5 KW Generator

COMPRESSION EQUIPMENT

10	12-gallon/minute High-pressure Water Lasers
3	22-gallon/minute High-pressure Water Lasers
1	1,000,000-Btu Burner
3	535,000-Btu Burners
1	500,000-Btu Hot Water Pressure Washer
4	500,000-Btu Steamers
1	750-CFM Air Compressor
7	185-CFM Air Compressors
10	350-CFM Air Blowers
2	150-CFM Aeration Vacuums
2	Portable Air Blowers
2	Portable Pressure Washers

WATER EQUIPMENT

5	Work Boats with Motor
2	30-foot Pontoon Boats
3000' 5	Oil Skimmer Heads
~~2400'~~	6-inch Containment Boom
750'	4-inch Containment Boom
21	Jon Boats
2	Robalo Boats
5	Marine Band Radios
22	Various H.P. Boat Motors
5	Boat Trailers

PUMPING EQUIPMENT

1	12-inch Vacuum Pressure Pump
1	8-inch Vacuum Pressure Pump
3	6-inch Vacuum Pressure Pumps
52	3-inch Electric Submersible Pumps
60	2-inch, 1 1/2-inch, 1-inch Electric Pumps
53	1 1/2-inch High-Pressure Homelite Pumps
14	3-inch and 4-inch Trash Pumps
1	2-inch Hydraulic Driven Pump
4	1-inch Chemical Feed Pumps
2	1/2-inch Chemical Feed Pumps
3	3/8-inch Chemical Feed Pumps
3	Explosion-proof Barrel Pumps
30	1 1/2-inch Fire Nozzles
1	Vacuum Pump (1/8 Horse-power)
2000'	3-inch and 4-inch Suction Hose
1000'	1 1/2-inch Suction Hose
1000'	4-inch Discharge Hose
1000'	3-inch Discharge Hose
1000'	2-inch Discharge Hose
1000'	1 1/2-inch Discharge Hose
5000'	6-inch Aluminum Transfer Pipe
40	3/4-inch Electric Water Pumps with Garden Hose Connections and Foot Valves (2)
5000'	50-foot Lengths Garden Hose
50	Nozzles (Garden Hose)
25	Güzzler Hand Pumps with Hoses
1	3-inch Hydrolic Sludge Pump

SPECIALIZED TOOLS AND EQUIPMENT

5	Peristaltic Testwell Pumps
12	Portable Controlled Flow Samplers
1	Hurst Power Tool
9	360° Hydraulic Drum Grapplers
4	Chemical Sealing Systems
1	Shredder
2	Split Spoon Soil Samplers
1	Drum Shredder - 250 Horsepower-diesel
3	Magnetic Metal Detectors
20	Water Level Indicator
1	1,100-gallon P.T.O. Drive Vacuum Unit
1	Blasting Machine with Galvonometer
1	Firing Wire Reel with 500-foot Wire
8	Petro-Tite Tank Testers
4	Petro-Tite Line Testers

MISCELLANEOUS TOOLS AND EQUIPMENT

2	Electric Hoists
1	Two-man Power Auger

6	Brush and Weed Cutters
2	Sandblasters
6	Survey Instrument Sets
12	Cutting Torches
14	Welders
5	Snowmobiles
4	Electric Hammers
34	Chain Saws
1	Barrel Cart
12	Angle Grinders
6	Pipe Threaders
1	175,000-Btu Space Heater
1	100,000-Btu Space Heater
1	100,000-Btu Furnace
12	Scaffolding
2	Reciprocating Saws
44	Pagers
4	Radio Telephones
39	Hand Radios
16	C.B. Radios

AVIATION EQUIPMENT

1	Citation II Jet
1	Beechcraft King Air Turbo Prop Plane

BARREL HANDLING EQIUPMENT

24	Barrel Carts
20	Barrel Pokers
24	Bung Wrenches (Steel)
100	Cases Permatex Gasket Spray
24	1/2-inch Impact Wrenches
48	1/2-inch Rachetts
48	15/16-inch Sockets
24	1/2-inch x 12-foot Chokers (Cable)
48	Nylon Chokers
36	3/4-inch Pin Clevis
12	3/4-inch x 12-foot Choker (Cable)
100	15-foot Chains
36	Barrel Suckers, 1 1/2-inch
50	Boxes Lumber Crayons
36	Barrel Fillers, 1 1/2-inch
25	Cylinder Clamps/Carriers

ELECTRICAL EQUIPMENT

24	3/8-inch Electric Drills with Bits
24	Skill Saws with Two Extra Blades
100	50-foot Extension Cords

PDC Response, Inc.

1113 N. Sworas Ave. Peoria, IL 61604
24 HOUR HOTLINE (309) 674-4236

EXHIBIT "B"

Manpower	Description
Response Team:	
Response Team Leader	Project Management/Supervision
Crew Leader	Foreman/Supervison
Response Technician	Haz Mat Handling/Eqmt. Operation
Laborer	No contact with Haz Mat
Support Personnel:	
Chemist	Chemistry/Sampling/Data Collection
Chemical Engineer	Chemistry/Engineering
Industrial Hygienist	Health & Safety/Industrial Hygiene
Management Staff	Administrative Function, e.g. Data Mngmnt.
Per Diem	Per man, in connection w/overnight stay

Materials	Description
Absorbent	Oil dry/50# bags
Air, Breathable	305 cubic foot cylinders
Blades For Quick Cutter	Carbide tipped/mason steel
Boom, Absorbent	For oil/8"x10', 4 ct/bale
Drums	55 gal. steel open top 17-H
Drums, Salvage	85 gal./recovery/overpack
Jar, Sample	Glass or plastic for lab samples
Pads, Absorbent	For oil/18"x18", 100 ct/bale
Pads, Absorbent	All purpose/LSM/18"x100'/bale
Tubes, Sampling	Glass rods for drum sampling

Equipment	Description
Air System - Main	Supplied-air/used with air units
Air Units	Supplied-SCBA combination unit used w/air system-main/per man Levels A, B
Auger, Sample	Hand auger for soil borings
Back Hoe	Rubber tire/delivery charge add'l.
Barrell Crusher	Mobile unit/explosion proof
Boat w/o Motor	John Boat
Boat	John Boat/25 h.p. outboard motor
Bobcat (975)	Bucket/steel tracks/double drum gabber/del. charge additional
Bobcat (825)	Bucket only/del. charge additional
Boom	Containment
Chipper	Pneumatic/scaler/spark proof blades
Colliwassa	Drum Sampler
Compressor	Compressed air for pneumatic tools/175 CFM

PDC RESPONSE, INC.

Equipment	Description
Cooling Units	Personnel body cooling units/ea. man
Gas Detection-Draeger	Pump & tube type instrument/tube add'l. $5/ea
Gas Detection-O.V.A.	Photoionizer/organic vapor analyzer
Gas Detection-Tritector	Explosimeter/0_2 deficiency/toxic gas det.
Gear-Level A (Personnel)	Protective Gear/ea. man/air equip. not incl.
Gear-Level B (Personnel)	Protective Gear/ea. man/air equip. not incl.
Gear Level C (Personnel)	Protective Gear/ea. man
Gear-Level D (Personnel)	Protective Gear/ea. man
Generator-5000	Portable 5000 Watt generator/110-220
Generator-2100	Portable 2100 Watt generator/110
Hose, 2" Suction	25' section
Hose, 3" Suction	25' section
Hose, 2" Discharge	100' section
Hose, 3" Discharge	100' section
Hose, 2" Floating	50' section
Lights, Explosion Proof	For use in explosion & confined space atmosphere/ea. unit
Lights, Area (Outdoor)	Quartz lighting sys./lights, cord, standards
Pump, 3" D/D	Carter double diaphram/hydraulic or gasoline
Pump, 2" D/D	Sandpiper D/D/pnuematic
Pump, 2" D/D Stainless	Sandpiper D/D/stainless steel w/viton/pneumatic
Pump, 3" S/D	Homelite single diaphram/gasoline
Pump, 3" Cent.	Centrifugal/gasoline
Pump, 2" Cent.	Centrifugal/gasoline
Pump, 1" Acid	Electric/for use w/acids & chemicals
Quick Cutter	Gasoline powered/blades charge additional
Radio	2-Way communication system/several units
Response Van	Field ofc/eqmt. trlr/mobile lab/del. chg. add'l
Semitruck	Van or box trailer
Semitruck	Aluminum dump trailer
Semitruck	Rolloff trailer
Semitruck	Tanker trailer/w/Carter 4" D/D dump
Semitruck	Tanker trailer/stainless steel w/vacuum pump/ coded corrossive, flammable
Telephone, Mobile	Mobile car telephone
Tools, SP. PF.	Spark proof tools/beryllium-copper alloy
Trailer, Decontamination	Field decon.unit/see also Response Van
Trailer, Flatbed	20' long
Truck, Light	4 x 4 Pickup or 1 ton/$50/day minimum
Truck, Water	Water wash/decontamination - standby
Truck, Water	Water wash/decontamination - in use
Truck, Rolloff	Straight truck/rolloff boxes
Vacuum, Hazardous Material	H.E.P.A. filter, act. carb. filters, Hg & trap

PDC RESPONSE, INC.

Equipment	Description
Vehicle, Transportation	Car/used to transport crew/$25/day minimum
Water Blaster, 10,000	10,000 p.s.i.
Water Blaster, 2,000	2,000 p.s.i.
Water Blaster, Hotsy	Heat & chemical feed
Wrench, Impact	Opening/closing drums, etc.
JD 690	Excavator w/operator
JD 555	Endloader w/operator (quantity=2)
JD 410	Backhoe w/operator
Cat 977	Track loader
Cat D6D	Widetrack Doze w/operator
Cat 120	Motor Grader w/operator
Cat 955L	Endloader w/operator
Cat 235	Excavator w/operator (quantity=3)

4700 N. Sterling Ave • Peoria, IL 61615
P.O. Box 9071 • Peoria, IL 61614

TRANSPORTATION EQUIPMENT

Equipment	Quantity
Tandem Tractors	15
Tandem Straignt Roll-Off Trucks	4
Dump Trailers	3
Tankers (equipped with various type pumps)	6
Vans	4
Roll-Off Trailers (36,000 lbs. capacity triaxle)	12
Miscellaneous pickups and support pieces	

PETROCHEM

Petrochem Services, Inc. P.O. Box 337 Lemont, Illinois 60439 (312) 739-1150

Equipment

- 3 3,000 gallon vacuum trucks
- 3 3,500 gallon vacuum trucks
- 5 5,000 gallon vacuum trailers
- 5 Diesel tractors
- 7 Flat bed and box trailers
- 4 Spill Response trailers
- 4 Van box trucks
- 9 Spill Response vehicles
- 2 Mobile communication van
- 12 Dewatering pumps
- 15 Spark proof air diaphragm transfer loading pumps
- 5 Mobile pressure wash systems
- 4 Portable lights
- 1 Oil skimmer
- Containment boom, 3,000 ft.
- 4 Bobcats
- 3 Hoe/loaders
- 1 Utility tractor
- Utility sheds
- 6 Work boats/motors
- 1 Mobile sludge dewatering system
- 6 In stock groundwater recovery systems
- Vacuum, air, fire and steam hoses
- 3 Portable pools
- 2 Portable carbon absorption systems
- 3 Portable oil/water separators
- 1 Office trailer
- 2 Decontamination trailers
- 4 Butterworth tank cleaning systems
- 1 Portable 150 hp boiler
- 6 Water treatment, storage tanks
- 4 Power generating units
- 5 Air compressors
- 1 Harbor tug
- 1 Drum ripper
- 15 Air movers
- 10 Gas and oxygen monitoring equipment
- 1 Truck mounted drill rig
- 4 HNU meters
- 2 HCN meters
- Supplied air systems
- 3 Pressure filters
- Exposure suits

EMERGENCY RESPONSE SERVICES

SAMSEL SERVICES. . .

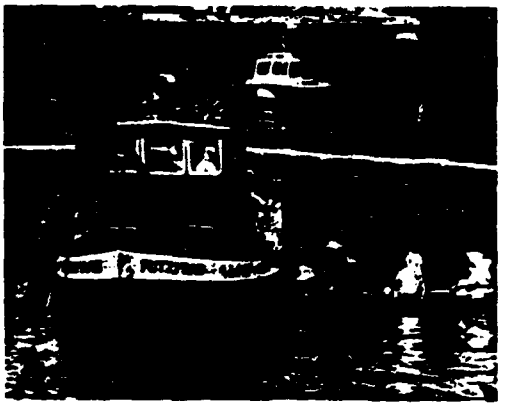
has been involved with pollution recovery and emergency spill response services since 1972. Originally established as the Pollution Recovery Systems Division of Samsel Rope & Marine Supply Co., the division evolved as a corporate response to its civic responsibility for improving the environment.

With a strong tradition in the marine industry, Samsel Services pioneered efforts to clean-up pollution in the Cuyahoga River and Cleveland Harbor area. The challenge of removing contaminants and debris from "the river that burned" resulted in the development of specially designed and patented pollution recovery equipment and vessels. The unique capabilities and effectiveness of this highly mobile operation have been demonstrated in hundreds of emergency spill clean-ups.

Today, Samsel Services has diversified its emergency response capabilities to include the clean-up of oil and hazardous material spills on water, land and underground. Experienced personnel in field and technical operations are skilled and continuously trained in the handling, containment and clean-up of oil and hazardous substances. This staff is supported by a large inventory of clean-up equipment and products, available for prompt dispatch to the spill scene.

Providing industry with effective spill prevention and clean-up resources, Samsel Services also works closely with the United States Coast Guard, the United States EPA, and state and local regulatory agencies in all phases of emergency response activities. This relationship promotes compliance with governmental regulations on: material handling, worker safety, clean-up operations, and the transportation and disposal of recovered substances.

When an environmental emergency exists, rely on the experience of Samsel Services to provide fast, efficient, and cost-effective response. Emergency response services are available for spills any time, by calling the 24 HOUR EMERGENCY HOT LINE - 216/241-0333.



POLLUTION VESSEL PUTZFRAU

CONTAINMENT AND CLEANUP OF AN OIL SPILL ON A NAVIGABLE WATERWAY

SAMSEL SERVICES

FOR FAST SERVICE CALL

SAMSEL SERVICES CO.
948 CARTER ROAD
CLEVELAND OHIO 44113
(216) 961-3949

"THE SERVICE PROFESSIONALS"
OIL & HAZARDOUS MATERIAL SERVICES

SPD Sand & Gravel
OLD U.S. 31 SOUTH
CHARLEVOIX, MICHIGAN 49720
616 547-4064 or 547-4063

October 8,1986

E-Tech Inc.
70 Dean Knauss Drive
Narragansett, Rhode Island 02882-1443
Atten.: Bill Fanning

Dear Mr. Fanning:

RE: This is a list of equipment and personnel of S.P.D. Sand and Gravel.

1 - TD15 International Dozer
1 - 450C John Deere Dozer
1 - 300 John Deere Backhoe
1 - 410E John Deere 4 Whl. Dr. Backhoe
1 - 544A John Deere 1 3/4 Yard Loader
1 - C42 Coyote 2 Yard Loader
2 - Ford Tandem Dump Trucks
1 - GMC Tandem Dump Truck
1 - GMC Single Axle Dump Truck
9 - Field Personnel

Respectfully Yours;

James E. Frye

James E. Frye, SUPERVISOR

JEF/knw

Stenberg Bros. Inc.

P.O. Box 127
Bark River, Mich. 49807
Wats No. 1-800-624-6086 or 466-9908

October 8, 1986

Mr. Bill Fanning
E-Tech, Inc.
70 Dean Knauss Drive
Narragansett, Rhode Island 02882-1143

Dear Mr. Fanning:

We have the following pieces of equipment ready for emergency response spills and for transportation of liquid waste and hazardous materials.

Three Vacuum Trucks - 3,000 gallon, 4,000 gallon.
One Vacuum Tanker - 5,000 gallon.
Four Tankers - 6,000 gallon-8,300 gallon.

We also have dump trucks, front-end loaders, bulldozers, and backhoes.

We have a staff of eight men ready for immediate emergency response. We can organize enough manpower for any size job.

Also, we have trained supervisors and certified hazardous-material technicians on our staff.

Sincerely,

Carl J. Stenberg
Secretary-Treasurer

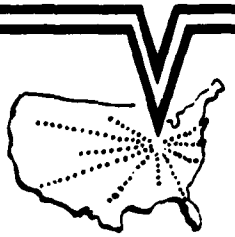
ms

Stony Acres
~~2069~~ NW Catawba Rd.
Port Clinton, Ohio 43452
Contact Ed Williams
Phone Day 419-797-4533 Night

Vacuum/Pumper Truck

Vacuum Truck 1800 Gal ID Number 00401
Number of Units 1 Storage Capacity 1800 gals
Pumping Capacity GPM

Vacuum Truck 2300 gal ID Number 00402
Number of Units 1 Storage Capacity 2300 gals
Pumping Capacity GPM



Valley Systems, Inc.

BOX 603 ☐ CANAL FULTON, OHIO 44614

216/854-4526

October 17, 1986

E-Tech, Inc.
70 Dean Knauss Drive
Narragansett, Rhode Island 02882-1443

Attention: Mr. Bill Fanning

Dear Mr. Fanning:

In response to your letter to Mr. Ken Hefling, I am providing the information you requested.

I am enclosing an equipment list for Valley Systems, Inc. which should provide the information needed. As of this date, Valley Systems, Inc. employs approximately 165 personnel, of which about 145 are field personnel. Valley Systems has offices in Canal Fulton, Ohio, Weirton, West Virginia, Chattanooga, Tennessee, Orange, Texas, and Augusta, Georgia.

Should you have any additional questions, please do not hesitate to contact me.

Sincerely yours,

Edward A. Weideman
Office Manager

EAW:lrw
enclosure

CURRENT VEHICLE LIST

V. ID.	YR	DESCRIPTION	SERIAL NUMBER
A07	80	FORD MUSTANG 3DR	0F03A122983
A11	75	BUICK CENTURY 2 DR	4N57J5H199942
A14	84	CADILLAC COUPE DEVILLE 2 DR	1G6AM4785E9119633
A15	84	OLDS 98 REGENCY 4 DR	1G3AG69Y5EM833045
A16	83	DODGE ARIES K 4 DR	1B3BD26C1DF288349
A17	84	PLYMOUTH STATION WAGON	1P3BP49C6EF230574
A19	84	PLYMOUTH RELIANT 4 DOOR	1P3BP26C2EF308468
A20	84	CHRYSLER NEW YORKER 4 DOOR	1C3BF66P0EX527862
A21	84	PLYMOUTH RELIANT WAGON	1P3BP49C4EF335081
A22	85	DODGE LANCER 4 DR	1B3BX48D1FN136072
A23	85	CHRYSLER LEBARON 4 DR	1C3BH48D2FN118390
E01	68	CHEVROLET C-60 W/PITMAN CRANE	CE638J115055
E02	72	RO MODEL MD70 TOTAL CONCEPT	169
E04	74	30 FT FIELD OFFICE	3572
E05	80	52 FT FIELD OFFICE	52-1243
E06		BUCKET MACHINE	
E07		BUCKET MACHINE	
E11	72	HORSE TRAILER	FS9TK0443
E13		STEAM JENNY (WEIRTON)	S13486
E14		STEAM JENNY (SHOP)	775
E17	82	BOAT TRAILER (TANDUM)	1YR010095CY002580
E19	82	HUSKY BOAT W/75HP OH-9207-XT	LWN6267AM82F
E21	79	GENERAL FLATBED TRAILER	8AP79153
E22		ELECTRIC HI-VAC	98
E25	74	35' OHIO TRAILER	FRP8569
E26	75	40' OHIO TRAILER	FRP9295
E27	78	CARGO TRAILER	
E30	83	MARK LINE BATH TRAILER 8 X 25	16334
E31	83	MARK LINE BATH TRAILER 8 X 25	16341
E33	83	8 X 30 OFFICE TRAILER	301019
E37	71	HOBBS SEMI TRAILER	BLM853304
E41	71	GREAT DANE TRAILER 40 X 13.5	51702
E45	72	DORSEY 40' PLATFORM TRAILER	99550
E46	84	EUROCLEAN PRESS WASHER W/HEAT	
E48	69	DORSEY 40' PLATFORM TRAILER	83753
E50		FORKLIFT 5000 LB CAPACITY	
E51		SP600DK GARDNER DENVER COMPRES	M8408
E52	84	8 X 36 OFFICE TRAILER	
E53	75	GREAT DANE VAN TRAIL 40'	315070
E54	72	OHIO VAN TRAILER 40'	FRP7115
E55	74	PETERBILT MODEL 352M TRACTOR	56607P
E56	73	OHIO VAN TRAILER	FRP8212R
E57	75	8 X 36 OFFICE TRAILER	4167
E58		AUSTIN WESTERN 410 CRANE	0000000
E59	68	ELGIN PELICAN MODEL S SWEEPER	S618
E60	72	ELGIN WHIRLWIND SWEEPER	226711C073477
E61		10 x 48 MOBILE OFFICE	PT10456
E62	84	LOBOY TRAILER	20990
E63	71	LAYTON TRAVEL TRAILER	LD3017F
E64	78	MACK TRUCK	R 685ST 71171
E65	78	MACK TRUCK	R 685ST 71221
E66	78	MACK TRUCK	R 685ST 71240
F01	69	INTERNATIONAL FLUSH TRUCK	416060H874501
F03	72	FORD F617C FLUSH TRUCK	F61CCP88308
F04	74	FORD N605D FLUSH TRUCK	N60DVT32865
F05	75	FORD F617C FLUSH TRUCK	N71FVW91858
F06	72	IHC FLUSH TRUCK	106620H341641

CURRENT VEHICLE LIST

V. ID.	YR	DESCRIPTION	SERIAL NUMBER
N04	79	FORD E100 CARGO VAN	E04BHEB3948
N06	79	CHEVROLET VAN TRUCK	CGL2597188485
N07	81	FORD ECONOLINE VAN TRUCK	1FMEE11F4BHA56295
N08	79	FORD ECONOLINE VAN TRUCK	E04GBFA0189
N09	79	FORD WINDOW VAN TRUCK	E25HBDJ1832
N10	84	DODGE RAM VAN TRUCK	2B7EK63C7ER211041
N11	80	FORD R707 VAN TRUCK	R70UVJG7124
N12	80	FORD R707 VAN TRUCK	R70UVJG7125
N13	84	DODGE RAM 350 WINDOW VAN	2B4KB31W2EK219522
N14	83	PLYMOUTH VOYAGER WINDOW VAN	2P4HB21U7DK333791
N15	80	FORD 22 VAN TRUCK	R71UVGG8940
N16	80	FORD 22 VAN TRUCK	R71UVGG8941
N17	84	DODGE RAM 250 PROSPECTOR VAN	2B4HB21T3EK292165
N18	77	INTER VAN TRUCK	D1035GCA19531
N19	81	INTER VAN TRUCK	1HTAA18E4BHA22620
N20	81	INTER MODEL C09670	1HTL2311BGA19953
N21	85	DODGE RAM 350 WINDOW VAN	2B4JB31T8FK240605
N22	80	MAXON TRUCK	CA80MXN1386
N23	80	MAXON TRUCK	CA80MXN1455
N24	80	MAXON TRUCK	CA80MXN1453
N25	85	CHEVY ASTRO VAN	1GCDM15N6FB119975
N26	76	IHC BUS MODEL 1603	D0812FHA15538
N27	80	IHC TRUCK MODEL CO1850	D1035KICA24876
N28	77	IHC CREW CAB TRUCK	D0522GHB25800
N29	77	IHC CREW CAB TRUCK	D0522GBH25806
P04	79	FORD F-250 PICKUP	F25BCFC1457
P08	80	FORD F-100 PICKUP	F10ECJH1596
P09	80	FORD F-250 PICKUP	F25ECJG3364
P10	79	FORD PICKUP	F25HCCE2244
P11	82	FORD F350 PICKUP	2FDJF37ZOCCA23893
P14	79	FORD PICKUP	F37HCDF4764
P15	82	FORD COURIER PICKUP	JC2UA1214C0609227
P17	83	FORD F250 STYLESIDE PICKUP	1FTFF25G3DLA53189
P18	80	FORD F250 STYLESIDE PICKUP	F25ELHJ2120
P19	82	GMC 4X4 PICKUP	1GTGK24J9CF705307
P20	82	GMC SIERRA PICKUP	1GTCS14B4C2501166
P21	81	FORD F250 PICKUP	2FTEF25E9BCA20408
P22	83	FORD F350 4X4 PICKUP	2FTHF36G0DCA60463
P23	79	FORD F250 STYLESIDE PICKUP	F25HLFE3440
P24	81	FORD F250 133 STYLESIDE PICKUP	1FTEF25EXBLA67601
P26	85	DODGE RAM 350 PICKUP	1B7KD36W0FS523090
P27	81	FORD F250 STYLESIDE PICKUP	2FTHF25E8BCA54238
P28	79	FORD F250 PICKUP	X25JKEK1246
P29	85	FORD F150 SUPERCAB	1FTEX15Y1FKB08128
P30	81	FORD BRONCO	1FMEU15G2BLA01542
P31	83	GMC S15	1GTCS14870850764
S02		HOT MACHINE-BEAVER OF CHATT	
S03	84	CAIN HIGH PRESSURE WASHER	380-289
S04	84	CAIN HIGH PRESSURE WASHER	380-292
S05	84	EUROCLEANER PRESSURE WASHER	
S06	84	EUROCLEANER PRESSURE WASHER	
T03	67	FORD 3M TV RIG	G40JLA47424
T04	81	CHEVROLET MOD CC6F042 TV RIG	1GBG621FXBV134987
U01	75	INTERNATIONAL PUMPER TRUCK	25795ECA12562
U02	74	FORD PUMPER TRUCK	U81HVT47090
U03	66	HEIL TANK TRAILER	915259
V01	78	FORD SUPERSUCKER	Y90CVAJ6354

CURRENT VEHICLE LIST

V. ID.	YR	DESCRIPTION	SERIAL NUMBER
V02	77	FORD SUPERSUCKER	Y90AVZ09280
V03	77	AUTOCAR SUPERSUCKER	X01FRGH079259
V04	76	FORD SUPERSUCKER	Y90HCV60658
V05	72	FORD VACTOR	G80CVM31868
V06	77	INTERNATIONAL SUPERSUCKER	D3117GGB20362
V07	77	INTERNATIONAL SUPERSUCKER	D3117GGB13415
V08	78	FORD SUPERSUCKER	D80BVAD6292
V09	76	INTERNATIONAL SUPERSUCKER	D3117FGB13961
V10	75	INTERNATIONAL SUPERSUCKER	75795EGB10918
V12	79	GUZZLER AUTOCAR	PS1FRGH089814
V13	79	GUZZLER AUTOCAR	PS1FRGH089815
V14	77	INTERNATIONAL SUPERSUCKER	D3117GGB13453
V15	73	INTERNATIONAL VACUUM TRUCK	75797CGA12591
V16	77	INTERNATIONAL VACUUM TRUCK	D3177GGB15370
V17	79	FORD VACUUM TRUCK	Y90VVDG7449
V18	74	IHC VAC-ALL	25791DCA15807
W01	78	AMERICAN WATER BLASTER	948
W02	79	AMERICAN WATER BLASTER	1421
W03	80	NATIONAL LIQUID BLASTER	1882
W04	80	NATIONAL LIQUID BLASTER	1873
W06	80	WOMA 57030 HYDROLAZER	
W07	80	NATIONAL LIQUID BLASTER	08316
W08	84	NATIONAL LIQUID BLASTER	38121
W09	84	HAMMELMAN PUMP / J. DEERE DIESEL	84014100870
W10		NATIONAL LIQUID BLASTER MODEL 101	
W11		NATIONAL LIQUID BLASTER MODEL 101	
WD1	84	ADMAC DIESEL INTENSIFIER	01-85-474
WD2	85	ADMAC DIESEL INTENSIFIER	11-84-466
WD3	85	ADMAC DIESEL INTENSIFIER	06-84-442
WD4	85	ADMAC DIESEL INTENSIFIER	03-85-486
WD5	85	ADMAC DIESEL INTENSIFIER	03-85-487
WD6	85	ADMAC DIESEL INTENSIFIER	03-85-488
WE0	84	ADMAC ELECTRIC INTENSIFIER	300960-2
WE1	84	ADMAC ELECTRIC INTENSIFIER	04-84-366
WE2	84	ADMAC ELECTRIC INTENSIFIER	04-84-449
WE3	84	ADMAC ELECTRIC INTENSIFIER	300960-1
WE4	85	ADMAC ELECTRIC INTENSIFIER	01-85-472
WE5	85	ADMAC ELECTRIC INTENSIFIER	01-85-473
WE6	85	ADMAC ELECTRIC INTENSIFIER	01-85-475

AUGUST, 1986

LICENSED HAULERS

LIQUID INDUSTRIAL WASTE
(Act 136, PA 1969)

AND

HAZARDOUS WASTE
(Act 64, 1979)

Prepared by: Hazardous Waste Division
Michigan Department of Natural Resources

GEOGRAPHICAL LISTING BY COUNTY AND STATE OF LICENSED WASTE HAULERS

ALLEGAN

A-1 Disposal Corp.
Bush Oil Company
Drug & Laboratory Disposal
Jerry Sall
Stoddard & Sons Co.

BARRY

Hastings Aluminum Products

BAY

Sun Ray Oil Co.

BERRIEN

Acme Disposal Co.
Industrial Sanitation
Krizman Metal Finishing
Signal Delivery Service, Inc.
Terrington Construction Co.

BRANCH

Tri-State Industrial Services

CALHOUN

Hammond Septic Tank Service
Paul Duncan, Inc.
Seiler Tank Truck Service

CHEBOYGAN

Cheboygan Sanitation
Tube Forming, Inc.

CLARE

Mid-Michigan Trucking Co.
Woods Contracting

CLINTON

Bee's Chevrolet & Oldsmobile, Inc.

DELTA

LeDuc's Septic Tank Service
Stenberg Brothers

EATON

General Aluminum Products
Global Plastics

GENESEE

Container Specialties, Inc.
J & W Leasing, Inc.
James P. Barkman, Inc.
Oil Chem, Inc.
Yoder Trucking

GOGEBIC

Stempihar Brothers Distributing

GRAND TRAVERSE

C-Land Excavating, Inc.
Egeler Industrial Waste, Inc.
Elmer's Crane & Dozer, Inc.
L. K. & R. Water Truck Service
Suntrell Production Services

GRATIOT

Alma Products
Total Petroleum Corp.
Total Pipeline Corp.

HILLSDALE

Polkow Oiling Service

HURON

Rooney contracting Co.
Talaski Excavating

INGHAM

Ashland Chemical Co.
Bill Barr, Inc.
Enviroland, Inc.
Ever Clean, Inc.
Granger Land Development
Michigan State University
Schultz Oil Service

IOSCO

Zubek, Albert

ISABELLA

Leo O. Kappler

KALAMAZOO

A & I Industrial Services
Tri-County Liquid Waste
Upjohn Company

KALKASKA

Beckman Production Services
Bronson Production Inc.
C & S Hogerheide Trucking, Inc.
Kalkaska Construction Service, Inc.
Mark Toteff & James Evans
A Partnership
Northern A-1 Sanitation Services

KENT

C F Waste Oil Collection
Clean Machine
Detrex Chemical Industries, Inc.
Environmental Control Services
Great Lakes Petroleum Producers
Haviland Products Company
McKesson Chemical Co.
Norton Shores Estates
Spartan Chemical Co.
Valley City Refuse Disposal
Verbrugge Oil Company
Waste Management of Michgian-
Grand Rapids

LIVINGSTON

Ace Transformer Service Co., Inc.

MACOMB

A.R.C. Oil
All Pro Sewer Corp.
Downriver Maintenance
Environmental Management (ENMANCO)
General Motors Corp.
Great Lakes Environmental Services
Houston, Inc.
Metro Tank Service
U.S. Chemical Company, Inc.
Wooster Industrial Service

MANISTEE

Bear Lake S.W.D. System
Northland Contractor, Inc.

MARQUETTE

Sodergren Septic Service

MIDLAND

Dow Chemical Company
Dow Corning Corp.
Midland Environmental Services

MONROE

Salco Corp.
Suburban, Inc.

MONTCALM

Jones & Behrenwald, Inc.
Lincoln Pines Resort, Inc.

MUSKEGON

Earl's Excavating
Sealed Power Corp.
Shoreline Waste Transportation
Thomas (Frank J.) Road Oiling
Thomas Solvents Co. of Muskegon
Zephyr, Inc.

OAKLAND

Aabco Road Oiling & Waste Oil
Pickup Service, Inc.
American Tank Service
B & V Construction Inc.
B.F.T. Oil Service Co.
Central Oil Service, Inc.
Checkmate Chemical Industries
Detrex Chemical Industries
GMC Truck & Bus Group
Great Northern Oil Company
GTE Valeron Corp.
Holly Containers
Medsker Electric, Inc.
Metalworking Lubricants, Inc.
Michigan Dust Control
Northern Electrical Testing, Inc.
Power Vac Service, Inc.
Rapid Parts Maintenance, Inc.
Road Maintenance Corp.
Transformer Inspection Retrofill
Vic's Waste Oil Service

OCEANA

Adams Trucking & Excavating

ONTONAGON

Wedtech of Michigan

OTSEGO

Higgins Industries
Northern Tank Truck Service

OTTAWA

BASF Wyandotte Corp.
Bruce Alan Enterprises, Inc.
Buescher's Pumping Service
Donnelly Mirrors, Inc.
Industrial Oil Purifiers, Inc.
J & T Distributing Inc.
Liquid Waste Services, Inc.
Michigan Organic Resources

SAGINAW

Bierlein Environmental Services
GMC Saginaw Steering Gear
H. Pruitt Trucking, Inc.
Painter Supply

SANILAC

Dott Manufacturing

SHIAWASSEE

Drury Brothers, Inc.
Johnson Controls, Inc.

ST. CLAIR

Consumers Power Company
  Gas Production & Transmission Dept.
Paul's Road Oiling Service
Van's Tank Truck Service

VAN BUREN

Harris Oil, Inc.
Palisades Park Country Club
Southwestern Michigan Dust Control

WASHTENAW

Contractor's Container Corp.
Franchi's Oil Service
Kelly Oil Company
Recovery Specialists, Inc.
Wolverine Disposal, Inc.

WAYNE

American Waste Oil
Ashland Chemical
Aetro Oil Corp.
B & H Trucking, Inc.
Bentley Oil Co.
Buck's Oil Company, Inc.
By-Products Recovery, Inc.
Chem-Met Services
Chemical Recovery Systems, Inc.
City Disposal Systems, Inc.
Dearborn Refining Co.
Detroit Edison co.
Detrex Chemical Industries
Doetsch Industrial Services, Inc.
Edwards Oil Service, Inc.
Elmer's Oil Service
Environmental Pollutin Control
Environmental Waste Control
Ernie Waste Hauling
Ford Motor-Research & Engineering
Ford Motor-Tech & Trans Operations
Freeport Aggregate, Inc.
General Oil Company
Great Lakes Sand Co.
Industrial Waste Handling Systems
Industrial Waste Transportation
Inland Waters Pollution Control
Justice Trucking
K & D Industrial Services, Inc.
Ken's Safeway Transport
Lanphar's Inc.
Lime Transport Co.
M.E. Trucking Co.
M.L. Asbury, Inc.
Mar-Lo Trucking, Inc.
McKesson Chemical Co.
Michigan Disposal
Michigan Pumping Service
MPC Environmental Div
Nave, Inc.
Nelson Industrial Services
Petro-Chem Processing, Inc.
Quanta Corp.
R & M Trucking Co., Inc.
Rabco Petroleum
Ref[illegible]s Transport & Terminal
Rov[illegible]. Trucking Co.
S & C Transport, Inc.
Sam's Trucking Corp.
Scarpace, L.J. Company
Sedlock & Francisco, Inc.
Small Quantity Specialists
Smith's Oil Service Co.
Special Waste Systems, Inc.
Suburban Oil Company

WAYNE (cont.)

Ternes Supply Co.
Total Pipe Maintenance
Towne-Robinson Fastener Co.
Tri-Way Management Systems, Inc.
United Paint Service, Inc.
Usher Oil Service, Inc.
Vac-All Services, Inc.
Waste Acid Services, Inc.
Waste Management of Michigan-West
Wayne State University
Wolverine Oil & Supply Co., Inc.

ALABAMA

Co.

ARKANSAS

Ensco Corp.

CALIFORNIA

American Environmental Mgmt. Corp.

CANADA

B & B Waste Recycling & Disposal
Breslube Enterprises
Buckham Transport Ltd.
Central Vacuum
Denco Leasing, Div.
Harold Marcus Ltd.
Honey-Bee Sanitation, Inc.
Services Sanitaires, Blainville, Inc.
Tricil (Quebec), Inc.
Tricil (Sarnia), LTd.

CONNECTICUT

Detrex Chemical Industries
MacDermid, Inc.
Sealand Environmental Services

DELAWARE

Conoco, Inc.
Custom Enviormmetnal (CET)
Matlack, Inc.
Serv. (FS)

FLORIDA

Chemical Conservation Corp.
P.I.E. Nationwide, Inc.

GEORGIA

Burnham Service Company
St. Joseph Motor Lines

ILLINOIS

Chemical Services Corp
Chemical Waste Management
C P Inorganics
D & L Transport, Inc.
Detrex Chemical Industries
Downer Electric
Eaglebrook Environmenal Corp.
Emergency Technical Services
Envirite Corp. M & M Chemical & Equipment
Fort Transfer Co.
Grimm Transport Co.
Kankakee Industrial Disposal
McKesson Chemical Co.
Mid-America Environment Service
Mr. Frank, Inc.
Olin Hunt Specialty Products
Petrochem Services, Inc.
Rocar Equipment Co.
Rogers Cartage Co.
Safety-Kleen Corp.
SET Liquid Waste System
South Chicago Disposal, Inc.
Southern California Chemical Co.
Waste Management, INc.
Wastex Research, Inc.

INDIANA

Ashland Chemical Co.
Berreth Oil, Inc.
CAM-CR/Westville
Chemical Waste Management, Inc.
Commercial Sewer Cleaning Co., Inc.
Detrex Chemical Industries, Inc.
Essex Group, Inc.
Indiana Liquid Transport, Inc.
Jack Gray Transport, Inc.
Koger's Inc.
Koontz-Wagner Electric
Metal Resources Corp.
Migler, Inc.
Titan Oil Co.
Van Waters & Rogers Rollins Environmental

IOWA

Aurora Supply, Inc.
Bork Transport, Inc.

KENTUCKY

Custom Industrial Services
L.W.D., Inc.

MASSACHUSETTS

Clean Harbors, Inc.
Jet Lines Services, Inc.
Suffolk Services, Inc.

MINNESOTA

Berg Oil Company, Inc.
Electric Equipment Service Corp.
G & T Trucking Co.
Indianhead Truck Lines, Inc.
Larsen Oil Co., Inc.
National Electric, Inc.
Three M Company

MISSOURI

Ricky Shaw & Sons Transportation

NEW JERSEY

American Industrial Marine Services
Applied Technology
C P Chemicals Inc.
Clean Industries Inc.
Continental Vanguard, Inc.
CPS Chemical Co., Inc.
Disposal Systems, Inc.
Environmental Transport Group
Freehold Cartage, Inc.
Gulbrandsen Co., Inc.
Merola Enterprises
Nappi Trucking Corp.
National Waste Disposal, Inc.
Pat Perretti Freight Service, Inc.
S-J Transportation Co.
S & W Waste, Inc.
Spectrserv, Inc.

NEW YORK

Buffalo Fuel Corp.
CECOS International Inc.
D & J Transportation Specialists
Elmwood Tank & Piping Corp.
Frontier Chemical Waste Process
Haz-O-Waste Corporation
Michigan Transformer Service, Inc.
Price Trucking Corp.
SCA Chemical Services
Tonawanda Tank Transport Service
W.H. Spiegel Sons d/b/a
Refuse Container Transport

NORTH CAROLINA

Caldwell Industrial Services

OHIO

Ace Liquid Waste Haulers
Alchem-Tron, Inc.
All American Sanitation Co.
Ashland Chemical Co.
Associated chemical & Environmental
Services (ACES)
Autumn Industries
Central Ohio Mobile Power Wash, Inc.
Chem-Freight, Inc.
Chemical Solvents, Inc.
Chemserve Environmental Co.
Columbus SteelDrum Co.
Cousins Waste Control Corp.
Dart Trucking Co., Inc.
Dennison Industrial Service Corp.
Detrex Chemical Industries, Inc.
Envirco
Environmental Management Control
Environmental Pollution Control Serv.
General Electric Co.
Floyd Trucking, Inc.
Hazardous Materials Transportation
High Voltage Maintenance Corp.
Hukill Chemical Corp.
Industrial Chemical Mgmt & Transp.
Leston Corp.
M. Petty & Sons Enterprises, Inc.
Metropolitan Environmental Inc.
Monte D. Lewis Trucking
O. H. Materials, Inc.
Research Oil Co.
Robinson Pipe Cleaning, INc.
Ross Transportation Services, Inc.
S. D. Myers, Inc.
Smith Trucking Services
Tadbit, Inc.
Unison Private Truck Fleet
Will's Trucking, Inc.
7-7, Inc.

OKLAHOMA

Environmental Transportation Serv.
U. S. Pollution Control

PENNSYLVANIA

Calgon Carbon Corp.
Chemical Leaman Tank Lines, Inc.
Clements Waste Services, Inc.
Delaware Container Co., Inc.
DelVecchio Sanitation Disposal Serv.
Horvith Trucks, Inc.
John Pirrommer, Inc.
Koppers Company, Inc.
Nuclear Support Services (ISCO)
Sechan Limestone Industries
SNow Environmental Service
Vo Gen
VSI, Inc.
Waste Conversion, Inc.
Weavertown Transport Leasing

RHODE ISLAND

R.S. Liquid Waste Disposal

SOUTH CAROLINA

Rayson Industrial Services
GSX Services

SOUTH DAKOTA

T & R Electric Supply Co., Inc.
T & R Service Co.

TENNESSEE

Crown Transport, Inc.
Oil Service Company, Inc.

VERMONT

New England Marine Contractors

VIRGINIA

Hazco International

WASHINGTON D.C.

Eastern Chemical Waste Systems

WEST VIRGINIA

Belpar Chemical Services, Inc.

WISCONSIN

Alliance Transport Services, Inc.
Aqua-Tech, Inc.
Ashland Chemical Co.
E & K Hazardous Waste Services, Inc.
G. W., Inc.
Hydrite Chemical Company
Rock Refining Company
Schneider Tank Lines, Inc.
Tank Transport, Inc.

Disposal Facilities Listing*

All wastes regulated under Act 64, P.A. 1979 (Michigan's Hazardous Waste Management Act) must be transported and disposed of in treatment, storage and disposal facilities in compliance with the Act.

All Resource Conservation and Recovery Act (R.C.R.A.) regulated waste must be transported and disposed of at treatment, storage, or disposal facilities having E.P.A interim authorization for handling the specific waste.

Oil Reclamation Facilities

American Waste, Inc.
(Pacific Oil Company)
44141 Yost Road
Belleville, MI 48111
(313) 397-2300

Astro Oil Company
27801 Cooke Street
Flat Rock, MI 48134
(313) 782-9896

Bill's Dust Control
Division of Industrial Petroleum
Specialties, Inc.
707 E. Lewiston
Ferndale, MI 48220
(313) 546-6100

Carter's Waste Oil Reclamation Inc.
615 Greendale
Detroit, MI 48203
(313) 368-8657

Dearborn Refining Company
3901 Wyoming
P.O. Box 525
Dearborn, MI 48121
(313) 843-1700

Edward's Oil Service
530 S. Rouge St.
Detroit, MI 48217
(313) 841-2265

Environmental Waste Control, Inc.
27140 Princeton Ave.
P.O. Box 431
Inkster, MI 48141
(313) 357-5680

General Oil Company
12680 Beech Daly Road
Detroit, MI 48239
(313) 535-2530

Michigan Petroleum
13650 Helen St.
Detroit, MI 48212
(313) 365-6800

*Listing or omission should not be construed as an endorsement or disapproval of a facility.

INTRODUCTION

This is a complete list of transporters who are licensed to haul hazardous and/or liquid industrial waste in Michigan. This list will be updated periodically. Also included is a list of disposal facilities.

Those generators licensed to haul only their own waste are indicated on the list by a single asterisk.

Questions regarding any waste hauler on this list should be directed to the District Office of the Hazardous Waste Division for the designated geographic area as shown on the map. Questions pertaining to haulers from out of the state should be directed to the Lansing central office.

This list is for informational purposes only and not a recommendation or endorsement for the listed waste haulers.

A & B Industrial Services, Inc.
A & B Sewer Cleaning, Inc.
5070 W. Michigan Avenue
Kalamazoo, MI 49007
(616) 375-9595

A-1 Disposal Corporation
400 Broad St.
P.O. Box 248
Plainwell, MI 49080
(616) 685-9801

Ashco Road Oiling & Waste Oil Pick-Up Service, Inc.
P.O. Box 3735
Oak Park, MI 48212
(313) 538-0050

Ace Liquid Waste Haulers
5055 Wooster Rd.
Cincinnati, OH 45226
(513) 871-8397

Ace Transformer Service Co., Inc.
135 Gordon Lane
Box 797
Fowlerville, MI 48836
(313) 522-8830

Acme Disposal Co.
2267 Shaw Rd.
Niles, MI 49120
(616) 684-4499

Adams Trucking & Excavating
P.O. Box 863
Pentwater, MI 49449
(616) 869-5234

Alchem-Trol, Inc.
7615 Bessemer
Cleveland, OH 44127
(216) 659-4056

All American Sanitation Co.
5101 Thompson Rd.
Gahanna, OH 43230
(614) 471-4884

All Pro Sewer Corp.
62520 Van Dyke
Washington, MI 48094
(313) 652-2223

Alliance Transport Services, Inc.
3100 Hwy 12 & 18
McFarland, WI 53558
(608) 249-0600

Alma Products*
2000 E. Michigan
Alma, MI 48801
(517) 463-1151

American Environmental Mgmt Corp.
11855 White Rock Rd.
Rancho Cordova, CA 95670
(916) 985-6666

American Industrial Marine Service
P.O. Box 9129
Newark, NJ 07104
(201) 589-0992

American Tank Service
(Industrial Petroleum Specialties)
707 E. Lewiston
Ferndale, MI 48220
(313) 544-6100

American Waste Oil
44141 Yost Rd.
Belleville, MI 48111
(313) 397-2300

Applied Technology Transportation
25 South Shore Drive
P.O. Box 1625
Toms River, NJ 08753
(201) 255-5163

Aqua-Tech, Inc.
140 S. Park St.
Port Washington, WI 53074
(414) 284-5744

Ashland Chemical Co.
Div. of Ashland Oil Inc.
1817 W. Indiana Ave.
South Bend, IN 46613
(219) 233-0033

Ashland Chemical Co.
Div. of Ashland Oil, Inc.
2011 Turner St.
Lansing, MI 48906
(517) 372-4165

Ashland Chemical Company
P.O. Box 2219
Columbus, OH 43216
(614) 889-3263

Ashland Chemical Company
Div. of Ashland Oil, Inc.
P.O. Box 678
Neenah, WI 54956
(414) 722-3371

Ashland Chemical**
19959 Vernier Rd.
Harper Woods, MI 48225
(313) 885-2500

Associated Chemical & Environmental Services (ACES)
871 Otter Creek Rd.
P. O. Box 7571
Oregon, OH 43616
(419) 726-1521

Astro Oil Corp.
27801 Cooke St.
Flat Rock, MI 48134
(313) 782-9896

Aurora Supply, Inc.*
Box 126
Aurora, IA 50607
(319) 636-3339

Autumn Industries
518 Perkins-Jones Rd.
Warren, OH 44483
(216) 372-9002

B & B Waste Recycling & Disposal*
1980 Belmore La.
Gloucester, Ontario
Canada K1B 4Z8. (613) 824-9364

B & H Trucking, Inc.
13933 Elwell
Belleville, MI 48111
(313) 697-2200

B & V Construction, Inc.
25301 Novi Rd.
Novi, MI 48050
(313) 347-0885

B.F.T. Oil Service Co.
Salvage Oil, Inc.
1970 Wismer St.
Box 382
Walled Lake, MI 48088
(313) 363-7266

BASF Corp.
Chemical Div.
401 Columbia Ave
Holland, MI 49423
(616) 392-2391

Bear Lake S.W.D. System
P.O. Box 243, US 31 North
Bear Lake, MI 49614
(616) 864-2142

Beckman Production Services
3784 Boone Rd.
P.O. Box 670
Kalkaska, MI 49646
(616) 258-9524

Bee's Chevrolet & Oldsmobile, Inc.
2100-2137 S. US-27
P.O. Box 209
St. Johns, MI 48879
(517) 224-2345

Belpar Chemical Services, Inc.
Route 1, Box 8
Mineral Wells, WV 26150
(304) 489-1118

Bentley Oil Co.
10652 Mortenview
P.O. Box 601
Taylor, MI 48180
(313) 281-8433

Berg Oil Company, Inc.
P.O. Box 333
Eveleth, MN 55734
(218) 744-3064

Berrech Oil, Inc.
1301 W. 6th St.
P.O. Box 610
Mishawaka, IN 46544
(219) 255-1255

Bierlein Environmental Services
2903 South Graham Rd.
Saginaw, MI 48603
(517) 781-1810

Bill Berr, Inc.
802 Tarleton
P.O. Box 1204
East Lansing, MI 48823
(517) 332-1352

Bork Transport, Inc.
2843 Ingersoll
Des Moines, IA 50312
(515) 244-7329

Brenlube Enterprises
(Speedy Oil)
P.O. Box 130
Brenlan, Ontario
Canada N0E 1M0, (519) 648-2291

Brennan Production, Inc.
309 Sanley Road
Kalkaska, MI 49646
(616) 258-4592

Bruce Alan Enterprises, Inc.
4368 Lincoln Rd.
Holland, MI 49423
(616) 396-2368

Bryson Industrial Services
411 Burton Rd.
Lexington, SC 29072
(803) 359-7027

Buckham Transport Ltd.
Box 601
Peterborough, Ontario
Canada K9J 6Z8, (705) 939-6311

Buck's Oil Company, Inc.
30110 Beverly
Romulus, MI 48174
(313) 368-7555

Buffalo Fuel Corp.
2441 Allen Ave.
Niagara Falls, NY 14303
(716) 285-9101

Burnham Service Company, Inc.
5000 Burnham Blvd.
Columbus, GA 31907
(414) 563-1120

Bush Concrete
See: Shoreline Waste Transportation
. Bush Oil Company
711 Clark St
Haveland, MI 49348
(616) 797-2102

Bussacher's Pumping Service
11305 E. Lakewood Blvd.
Holland, MI 49423
(616) 392-9653

By-Products Recovery, Inc.
39209 Ecorse Rd.
P.O. Box 156
Romulus, MI 48174
(313) 595-1666

C & S Hagerbeide Trucking Inc.
P.O. Box 36
US 131
South Boardman, MI 49680
(616) 369-2801

C F Waste Oil Collection
Crystal Flash Petroleum Corp.
P.O. Box 1804
1765 Alpine, NW
Grand Rapids, MI 49504
(616) 363-4451

C P Chemicals Inc.
7 Arber St.
P.O. Box 138
Somerset, NJ 07077
(313) 636-4300

C P Inorganics
Industry Avenue
Joliet, IL 60435
(815) 727-1074

C-Land Excavating, Inc.
767 Dunn Rd.
P.O. Box 1231
Traverse City, MI 49685
(616) 946-7307

Caldwell Industrial Services Inc.
P.O. Box 881
Lenoir, NC 28645
(704) 396-2304

Calgon Carbon Corporation
P.O. Box 717
Pittsburgh, PA 15230
(412) 787-6700

CAM-OR/Wooville
Div. of CAM-OR Inc.
P.O. Box 507
Woodville, IN 46391
(219) 785-2534

CECOS International, Inc.
2321 Kenmore Ave.
Buffalo, NY 14207
(716) 873-4200

Central Maintenance Pipe
3425 Van Born Ct.
Dearborn Heights, MI 48125
(313) 292-1971

Central Ohio Mobile Power Wash, Inc
(COMP Industrial Services)
P.O. Box 187
8376 Lancaster Newark Rd.
Baltimore, OH 43105
(614) 837-3339

Central Oil Service, Inc.
A-1 Waste Oil Pickup
1509 Williams Drive
Pontiac, MI 48053
(313) 673-1253

Central Vacuum
50 Champetre
Montreal, Quebec
Canada H1B 5G6, (514) 373-1939

Checkmate Expediting & Trucking
33 Hood St.
Pontiac, MI 48058
(313) 338-7860

Chem-Freight Inc.
33 Industry Drive
Bedford, OH 44146
(216) 439-2955

Chem-Met Services
19550 Allen Road
Wyandotte, MI 48192
(313) 282-9250

Chemical Conservation Corp.
653 Rocket Blvd.
Orlando, FL 32824
(305) 859-4441

Chemical Leaman Tank Lines, Inc.*
102 Pickering Way
P.O. Box 200
Exton, PA 19341
(215) 363-4200

Chemical Recovery Systems, Inc.
36345 Van Born Rd.
Romulus, MI 48174
(313) 326-3100

Chemical Services Corp.
4330 W. 137th Place
Crestwood, IL 60445
(312) 597-3380

Chemical Solvents Inc.
3751 Jennings Road
Cleveland, OH 44109
(216) 741-9310

Chemical Waste Management
4300 W. 123rd St.
Alsip, IL 60658
(312) 396-1920

Chemical Waste Management, Inc.
2701 S. Coliseum Blvd., Suite 1016
Fort Wayne, IN 46803
(219) 423-1655

Chemserve Environmental Co.
1331 Research Rd.
Blacklick, OH 43004
(614) 866-1800

Chicago Industrial Waste Haulers
5311 W. 123rd Place
Alsip, IL 60658
(312) 349-0311

City Disposal Systems, Inc.
1350 Harper
Detroit, MI 48211
(313) 923-3300

Clean Harbors Inc.
P.O. Box 193
100 Joseph St.
Kingston, MA 02364
(617) 585-5111

Clean Industries, Inc.
1400 E. Elizabeth Ave.
Linden, NJ 07036
(617) 567-6500

Clean Machine
1580 Eastern Ave., SE
Grand Rapids, MI 49507
(616) 245-2155

Clements Waste Services, Inc.
2001 Born Road, Executive Park
Wyomissing, PA 19610
(215) 376-7471

Columbus Steel Drum Co.
1385 Blatt Blvd.
Blacklick, OH 43004
(614) 864-1900

Commercial Sewer Cleaning Co., Inc.
531 Virginia Ave.
Indianapolis, IN 46203
(317) 632-4370

Conoco, Inc.
Surface Transportation Dept.
250 Airport Rd.
New Castle, DE 19720
(302) 323-1005

Consumers Power Company
Gas Production & Transmission Dept.
[illegible] W. Michigan Avenue
Jackson, MI 49201
(517) 788-0935

Container Specialties, Inc.*
3261 Flushing Rd.
Flint, MI 48504
(313) 234-0222

Continental Vanguard, Inc.
204 Harding Ave.
Bellmawr, NJ 08031
(609) 931-0950

Contractors Containers Corp.
3681 Stone School Road
Ann Arbor, MI 48104
(313) 971-8548

Cousins Waste Control Corp.
1801 E. Manstmeer Rd.
Toledo, OH 43612
(419) 726-1500

CPS Chemical Co., Inc.*
P.O. Box 162
Old Waterworks Rd.
Old Bridge, NJ 08857
(201) 727-3100

Crown Transport Inc.
7909 Shelby Oaks Dr., Suite 100
Memphis, TN 38134
Custom Env. Transport (CET), Inc.
(formerly Pollins Environmental)
P.O. Box 2349
Wilmington, DE 19899
(302) 479-2761

Custom Industrial Services
921 Corporate Drive, Suite 200
Lexington, KY 40503
(606) 223-5010

D & J Transportation Specialists
227 Solar St.
Syracuse, NY 13204
(315) 475-4989

D & L Transport, Inc.
1800 S. Laramie Ave.
Cicero, IL 60650
(800) 323-4950

Dart Trucking Co., Inc.
61 Railroad St.
P.O. Box 89
Canfield, OH 44406
(216) 533-9641

Dearborn Refining Co.
3901 Wyoming
P.O. Box 525
Dearborn, MI 48120
(313) 843-1700

Delaware Container Co., Inc.
W. 11th Ave. & Valley Rd.
Coatesville, PA 19320
(215) 383-4600

DelVecchio Sanitation Disposal Serv
P.O. Box 67
Dunmore, PA 18512
(717) 344-7812

Domco Leaming Div.
Ontario, Ltd.
RR #3, Hwy 2 West
Rochwell, Ontario
Canada N0P 1C0. (519) 695-2805

Dominion Industrial Service Corp.
151 E. Aurora Rd.
Northwood, OH 43619
(419) 691-2451

Detrex Chemical Industries Inc.
Gold Shield Solvents Division
2283 Distributors Drive
Indianapolis, IN 46256
(317) 241-9379

Detrex Chemical Industries Inc.
Gold Shield Solvents Division
12806 Eaton Ave
Detroit, MI 48227
(313) 491-4550

Detrex Chemical Industries, Inc.
Gold Shield Solvent Div.
240 Chapel Ave.
South Windsor, CT 26074
(203) 528-4471

Detrex Chemical Industries, Inc.
Gold Shield Solvents Div.
2537 Lemoyne Ave.
Melrose Park, IL 60160
(312) 345-1806

Detrex Chemical Industries, Inc.
Gold Shield Solvents Division
312 Ellsworth Ave., SW
Grand Rapids, MI 49503
(616) 454-9269

Detrex Chemical Industries, Inc.
Gold Shield Solvents Division
4000 Town Center, Suite 1100
Southfield, MI 48175
(313) 358-5800

Detrex Chemical Industries, Inc.
Gold Shield Solvents Div.
1410 Chardon Rd.
Euclid, OH 44117
(216) 692-2464

Detroit Edison Company*
Warren Service Center
2000 Second Ave.
Detroit, MI 48226
(313) 237-8618

Detroit Edison Company*
2000 Second Avenue
Detroit, MI 48226
(313) 897-0035

Disposal Systems, Inc.
P.O. Box 696
Freehold, NJ 07728
(201) 431-5281

Doerach Industrial Services, Inc.
Doerach Brothers, Inc.
5435 E. Davison
Detroit, MI 48212
(313) 368-8161

Donnelly Mirrors, Inc.*
49 W. 3rd St.
Holland, MI 49423
(616) 396-2428

Dort Manufacturing Company*
3768 N. Main St.
Dockerville, MI 48427
(313) 376-2465

Dow Chemical Company*
2010 Dow Center
Midland, MI 48674
(517) 636-0503

Dow Chemical Company*
Larkin Lab
1691 E Swede Rd.
Midland, MI 48640
(517) 636-2406

Dow Chemical Company*
Ag Organic Center
4520 E. Ashman
P.O. Box 1706
Midland, MI 48640
(517) 636-0058

Dow Chemical U.S.A.*
Michigan Division
Midland Location, 628 Building
Environmental Services
Midland, MI 48667
(517) 636-2338

Dow Corning Corp.*
Midland Plant
3901 S. Saginaw Rd.
Midland, MI 48686
(517) 496-4000

Downriver Maintenance Corp.
38155 St. Mary
Mt. Clemens, MI 48043
(313) 286-1330

Downer Electric
P.O. Box 829
Mt. Vernon, IL 62864
(618) 242-0190

Drug & Laboratory Disposal, Inc.
33 Broad St.
P.O. Box 168
Plainwell, MI 49080
(616) 685-9821

Drury Brothers, Inc.
13950 E. Newburg Rd.
Dundee, MI 48429
(313) 529-7611

D & W Hazardous Waste Services Inc.
4014 Highway 42 North
Sheboygan, WI 53081
(414) 458-6030

Eaglebrook Environmental Corp.
P.O. Box 1297
Homewood, IL 60430
(800) 628-3311

Earl's Excavating
3918 Holton Rd.
Muskegon, MI 49445
(616) 744-5963

Eastern Chemical Waste System
P.O. Box 13085
Washington, DC 20009
(202) 636-9555

Edwards Oil Service, Inc.
930 South Rouge St.
Detroit, MI 48217
(313) 841-2263

Egeler Industrial Waste, Inc.
9244 Cedar Run Rd.
Traverse City, MI 49684
(616) 946-4801

Electric Equipment Service Corp.
7281 Commerce Circle West
Minneapolis, MN 55432
(612) 571-2630

Elmer's Crane & Dozer, Inc.
1689 Park Dr.
Traverse City, MI 49684
(616) 947-9193

Elmer's Oil Service
15149 California Circle
Southgate, MI 48195
(313) 284-5795

Elmwood Tank & Piping Corp.
200 Fire Tower Drive
Tonawanda, NY 14150
(716) 694-0106

Emergency Technical Services
1026 Morse Ave.
Schaumburg, IL 60193
(312) 980-1872

Enaco, Inc.
P.O. Box 1957
American Oil Rd.
El Dorado, AR 71730
(501) 863-7173

Envirco
Div. of Whan Construction
48185 Lodge Rd.
Leetonia , OH 44431
(216) 424-9599

Envirite Corp.
16435 Center Ave.
Harvey, IL 60426
(312) 596-7040

Enviroland, Inc.
P.O. Box 178
Dewitt, MI 48820
(517) 669-5573

Environmental Control Services
525 54th St., SW
Wyoming, MI 49508
(616) 532-5767

Environmental Management Control
1141 County Road 951
Genoa, OH 43430
(419) 855-8378

Environmental Management Div.
EnMasCo Corp.
P.O. Box 239
343 N. Groesbeck Hwy
Mt. Clemens, MI 48043
(313) 731-3130

Environmental Pollution Control
36700 South Huron Rd.
New Boston, MI 48164
(313) 753-4616

Environmental Pollution Control
Services
250 N. Cleveland-Massillon Rd.
P.O. Box 5555
Akron, OH 44313
(216) 867-8925

Environmental Transport Group, Inc.
P.O. Box 296
Flanders, NJ 07836
(201) 347-8200

Environmental Transportation Serv.
P.O. Box 36118
Oklahoma City, OK 73136
(405) 424-0030

Environmental Waste Control, Inc.
27140 Princeton
P.O Box 431
Inkster, MI 48141
(313) 561-1400

Ernie Waste Hauling, Inc.
1980 Lexington Parkway
Inkster, MI 48141
(313) 595-8896

Essex Group, Inc.*
LDM Department
1601 Wall St.
Fort Wayne, IN 46804
(219) 248-3524

Ever Clean Inc.
1478 W. Grand River
Okemos, MI 48864
(517) 349-2311

Floyd Trucking, Inc.
8513 South Drive
Maineville, OH 45039
(513) 683-2199

Ford Motor Company*
Research & Engineering
21500 Oakwood Blvd.
Dearborn, MI 48121
(313) 322-4828

Ford Motor Company*
Transportation & General Services
108 Construction Services Bldg.
3001 Miller Rd.
Dearborn, MI 48121
(313) 337-8580

Fort Transfer Co.
P.O. Box 457
Morton, IL 61550
(309) 263-2000

Franchi's Oil Service
330 W. Davis, Apt. #2
Ann Arbor, MI 48103
(313) 994-9043

Freehold Cartage, Inc.
P.O. Box 4429
Freehold, NJ 07728
(201) 462-1001

Freeport Aggregate, Inc.
20225 Pennsylvania
Wyandotte, MI 48192
(313) 285-7810

Frontier Chemical Waste Process
Castport Industrial Warehousing
4626 Royal Ave.
Niagara Falls, NY 14303
(716) 285-8208

G & T Trucking Co.
11111 Dunes Rd.
Elko, MN 55020
(612) 461-2180

G. V. Inc.
902 S. Main St.
P.O. Box A
Saukville, WI 53080
(414) 284-3427

General Aluminum Products*
1023 Reynolds Rd.
Charlotte, MI 48813
(517) 543-3362

General Electric Company
4477 East 49th St.
Cleveland, OH 44125
(216) 883-1000

General Motors Corporation*
12800 Mound Rd.
Warren, MI 48090
(313) 575-0299

General Oil Company, Inc.
12680 Beech-Daly Rd.
Redford, MI 48239
(313) 535-2530

Global Plastics Corp.*
1014 Reynolds Rd.
Charlotte, MI 48813
(517) 543-3632

GMC Saginaw Steering Gear*
3900 Holland Rd.
Saginaw, MI 48604
(517) 776-4258

GMC Truck & Bus Group*
31 Judson St
Pontiac, MI 48058
(313) 456-4161

Granger Land Development Co.*
2335 Wood Rd.
P.O. Box 27185
Lansing, MI 48909
(517) 372-2800

Great Lakes Environmental Services
Stock Brothers Corp.
22??? Mound Rd.
Warren, MI 48091
(313) 758-0400

Great Lakes Petroleum Producers
1860 Kenowa SW
Grand Rapids, MI 49504
(616) 453-9623

Great Lakes Sand Co.
20945 Five Mile Rd.
Livonia, MI 48154
(313) 261-4040

Great Northern Oil Company
12680 Beech Daly Rd.
Redford, MI 48239
(313) 544-4040

Grimm Transport Co.
1801 N. Morton Ave.
Morton, IL 61550
(309) 263-4437

GSX Services
(Triangle Resource Industries)
P.O. Box 210799
Columbia, SC 29221
(803) 798-2993

GTE Valeron Corporation*
750 Stephenson Hwy
Troy, MI 48007
(313) 589-1000

Gulbrandsen Co., Inc.
47 Bridge St.
P.O. Box 508
Milford, NJ 08848
(201) 995-7759

H. Pruitt Trucking, Inc.
3130 Williamson Rd.
Saginaw, MI 48601
(517) 777-8557

Hammond Septic Tank Service
152 Alden Lane
East Leroy, MI 49051
(616) 979-1198

Harold Marcus Limited
RR #3, Highway 2 West
Bothwell, Ontario
Canada N0P 1C0. (519) 695-2721

Harris Oil, Inc.
P.O. Box 30
401 S. Center St.
South Haven, MI 49090
(616) 637-1609

Hastings Aluminum Products*
429 S. Michigan Ave.
Hastings, MI 49058
(616) 945-3461

Haviland Products Company
421 Ann St., NW
Grand Rapids, MI 49504
(616) 361-6691

Haz-O-Waste Corporation
Canal Rd.
Baldwinsville, NY 13163
(315) 530-0033

Hazardous Materials Transportation
[illegible] Mosteller Rd.
Cincinnati, OH 45241
(513) [illegible]

Hazco International, Inc.
5301 Lee Hwy.
Arlington, VA 22207
(800) 237-1333

HazMat Environmental Group, Inc.
269 Parkside Ave.
P.O. Box 676
Buffalo, NY 14214
(716) 877-5532

Higgins Industries*
108 Garfield St.
Vanderbilt, MI 49795
(517) 983-3331

High Voltage Maintenance Corp.
7200 Industrial Park Blvd.
Mentor, OH 44060
(216) 255-4607

Holly Containers*
20611 W. 12 Mile Rd., Suite 203
Southfield, MI 48076
(313) 634-2676

Honey-Bee Sanitation Inc.
2201 Janette Ave.
Windsor, Ontario
Canada N8X 1Z9. (519) 254-1168

Horwith Trucks, Inc.
Rte. 329, Box 7
Northampton, PA 18067
(215) 261-2220

Houston, Inc.
17844 Oakdale
Roseville, MI 48066
(313) 772-2341

Hukill Chemical Corp
7013 Krick Rd.
Bedford, OH 44146
(216) 232-9400

Hydrite Chemical Company
P.O. Box 13188
Milwaukee, WI 53213
(414) 257-2300

Indiana Liquid Transport, Inc.
7901 W. Morris St.
Indianapolis, IN 46231
(317) 241-9406

Indianhead Truck Line, Inc.
P.O. Box 64355
St. Paul, MN 55164
(612) 633-2661

Industrial Chemical Management
and Transportation
1183 Market St.
Troy, OH 45373
(513) 339-5741

Industrial Oil Purifiers, Inc.
695 Lincoln Ave.
Holland, MI 49423
(616) 392-2107

Industrial Sanitation
157 Hinkley
P.O. Box 764
Benton Harbor, MI 49022
(616) 926-6360

Industrial Waste Handling Systems
(Great Lakes Water Blasting)
163 N. Morrell
Detroit, MI 48209
(313) 849-1800

Industrial Waste Removal
550 Industrial Drive
Lewisberry, PA 17339
(717) 938-6745

Industrial Waste Transportation
24356 Kings Road
Romulus, MI 48174
(313) 479-0660

Inland Waters Pollution Control
24356 King Rd.
Romulus, MI 48174
(313) 479-0660

J & T Distributing, Inc.
11830 24th Ave.
Marne, MI 49435
(616) 677-1683

J & W Leasing, Inc.
7277 Grand Blanc Rd.
Grand Blanc, MI 48439
(313) 655-4800

Jack Gray Transport, Inc.
4600 East 15th Ave.
Gary, IN 46403
(219) 938-7020

James P. Barkman, Inc.
1345 W. Hill Rd.
Flint, MI 48507
(313) 234-1601

Jerry Sall
4390 132nd Ave.
Hamilton, MI 49419
(616) 751-5360

Jet Line Services, Inc.
4418 Canton St.
P.O. Box 180
Stoughton, MA 02072
(617) 344-2510

John Pfrommer, Inc.
260 Ben Franklin Hwy.
Douglassville, PA 19518
(215) 385-3051

Johnson Controls, Inc.*
Battery Division
951 Aiken Rd.
Owosso, MI 48867
(517) 723-7831

Jones & Behrenwald, Inc.
150 10th St.
Lakeview, MI 48850
(517) 352-6307

Justak Brothers & Company, Inc.
P.O. Box 389
Whiting, IN 46394
(219) 933-4600

Justice Trucking
18628 Buffalo
Detroit, MI 48234
(313) 893-3287

K & D Industrial Services, Inc.
5470 Beverly Plaza
Romulus, MI 48174
(313) 729-3350

Kalkaska Construction Service, Inc.
418 South Maple
Kalkaska, MI 49646
(616) 258-9134

Kankakee Industrial Disposal
K.I.D. Inc.
1360 E. Locust
Kankakee, IL 60901
(815) 933-2931

Kelly Oil Company
7140 Bennett Rd.
Ann Arbor, MI 48107
(313) 783-3120

Ken's Safeway Transport
27780 Kee Drive
Grosse Ile, MI 48138
(313) 671-5120

Koger's Inc.
R #1, Box 55-18
Stilesville, IN 46180
(317) 539-5250

Koontz-Wagner Electric
3801 Voorde Drive
South Bend, IN 46628
(219) 232-2051

Koppers Company, Inc.
430 Seventh Ave.
Pittsburg, PA 15219
(412) 227-2000

Krizman Metal Finishing*
P.O. Box 393
St. Joseph, MI 49085
(616) 925-2195

L. K. & R. Water Truck Service
22870 12 Mile Rd.
P.O. Box 487
Mesick, MI 49684
(616) 885-1665

L.W.D., Inc.
P.O. Box 327
Calvert City, KY 42029
(502) 395-8313

Laidlaw Carriers, Inc.
505 Athelone
Woodstock, Ontario
Canada N4S 7N8, (519) 539-6103

Lansher's, Inc.
27102 Grand River
Detroit, MI 48240
(313) 727-1569

Larsen Oil Co., Inc.
507 Sherman
N. Mankato, MN 56001
(507) 625-8130

LeDuc's Septic Tank Service
2505 Triple Creek 23rd Rd.
Cornell, MI 49818
(906) 428-1700

Lee O. Kappler
265 South Chippewa Rd.
Mt. Pleasant, MI 48858
(517) 772-2609

Lenton Corporation
2017 Valley St.
P.O. Box 292
Dayton, OH 45404
(513) 222-1109

Lima Transport Co.
4800 Parkside Blvd.
Allen Park, MI 48101
(313) 843-6050

Lincoln Pines Resort, Inc.
13033 19 Mile Rd., NE
Gowen, MI 49326
(616) 984-2100

Liquid Waste Services, Inc.
14200 Creswell St.
West Olive, MI 49460
(616) 772-9666

M & M Chemical & Equipment Co.
P.O. Box 291
Gadsden, AL 35902
(205) 538-3800

M. Perry & Sons Enterprises, Inc.
P.O. Box 16100
Toledo, OH 43616
(419) 698-8433

M.E. Trucking Co.
12850 Evergreen Rd.
Detroit, MI 48223
(313) 272-5335

M.L. Asbury, Inc.
1100 S. Oakwood Ave.
Detroit, MI 48217
(313) 841-1457

MacDermid, Inc.
526 Huntingdon Ave.
Waterbury, CT 06708
(203) 575-5700

Mar-Lo Trucking, Inc.
1287 Merriman
Westland, MI 48185
(313) 722-0608

Mark Tetoff & James Evans
A Partnership
490 E. Dresdent St.
P.O. Box 627
Kalkaska, MI 49646
(616) 258-9409

Maciack, Inc.
P.O. Box 1791
One Rollins Plaza
Wilmington, DE 19803
(302) 479-2718

McKesson Chemical Co.
900 Hunter, Suite 300
Oakbrook, IL 60521
(312) 986-4300

McKesson Chemical Co.
27001 Trolley Industrial Dr.
Taylor, MI 48180
(313) 295-7700

McKesson Chemical Co.
7025 Dutton Industrial Dr.
Dutton, MI 49316
(616) 698-7330

Medaker Electric, Inc.
28650 Grand River Ave
Farmington Hills, MI 48024
(313) 478-1918

Merola Enterprises
31 Clarkson Dr.
P.O. Box 4845
Toms River, NJ 08754
(201) 929-3500

Metal Resources Corp.
3113 S. Gertrude
P.O. Box 2856
South Bend, IN 46680
(219) 287-3311

Metalworking Lubricants Co.
6785 Telegraph Rd.
Birmingham, MI 48010
(313) 642-0410

Metro Tank Service
12347 11 Mile Rd.
Warren, MI 48093
(313) 756-8789

Metropolitan Environmental, Inc.
P.O. Box 409
Celina, OH 45822
(419) 586-6638

Michigan Disposal
49350 I-94 Service Drive
P.O. Box 5116
Dearborn, MI 48111
(313) 326-0204

Michigan Dust Control
56 E. Lehigh
Pontiac, MI 48055
(313) 334-3561

Michigan Organic Resources
P.O. Box 725
Grand Haven, MI 49417
(616) 842-1210

Michigan Pumping Service
2619 Superior
P.O. Box 111
Trenton, MI 48183
(313) 675-0225

Michigan State University*
302 N. Kedzie
East Lansing, MI 48823
(517) 355-0153

Michigan Transformer Service Inc.
P.O. Box 1077
Concord, NY 03301
(603) 224-4006

Mid-America Environment Service
13840 S. Halsted St.
Riverdale, IL 60627
(312) 841-7020

Mid-Michigan Trucking Co.
496 Maple Rd.
P.O. Box 512
Farwell, MI 48622
(517) 588-9761

Midland Environmental Services
1407 E. Grove
P.O. Box 2367
Midland, MI 48614
Migler, Inc.
329 N. State St.
P.O. Box 3
Kendallville, IN 46755

Henry D. Lewis Trucking
49125 Old Hopedale Rd.
Box 518
Hopedale, OH 43976
(614) 937-2641

Harvey Trucking Company
1926 Commercial Drive
P.O. Box 530
Mt. Pleasant, MI 48858
(517) 772-6971

Hereos Energy, Inc.
ABC Oil
7601 W. 47th St.
McCook, IL 60525
(313) 779-0370

HPC Environmental Division
Marine Pollution Control
6631 W. Jefferson Ave.
Detroit, MI 48209
(313) 849-2333

Mr. Frank, Inc.
201 W. 155th St.
South Holland, IL 60473
(312) 596-3377

Hoppi Trucking Corp.
P.O. box 510
Morristown
Matawan, NJ 07747
(201) 5663000

National Electric, Inc.
21400 Hamburg Ave.
P.O. box 820
Lakeville, MN 55044
(612) 469-3475

National Waste Disposal, Inc.
432 Stokes Avenue
Trenton, NJ 08638
(609) 883-1420

Nava, Inc.
13500 Telegraph Rd.
Redford, MI 48239
(313) 531-8881

Nelson Industrial Services, Inc.
12345 Schaefer Hwy.
Detroit, MI 48227
(313) 933-1850

New England Marine Contractors
13 Dorset Lane
Williston , VT 05495
(802) 879-6800

Northern A-1 Sanitation Services
3947 US 131 N
P.O. Box 40
Kalkaska, MI 49646
(616) 258-9981

Northern Electrical Testing, Inc.
1987 Larchmead Ave.
Troy, MI 48083
(313) 689-8980

Northern Tank Truck Service
10664 Pennsboro Rd.
P.O. Box 8
Vestaburg, MI 48797
(517) 732-7531

Northland Contractor, Inc.
134 8th St.
Manistee, MI 49660
(616) 723-9055

Norton Shores Estates
3011 28th St., SW
Grandville, MI 49418
(616) 531-0620

Nuclear Support Services
I.S.C.O
West Market St.
Cambelltown, PA 17010
(201) 443-3150

O. H. Materials, Inc.
16406 US Rte 224 East
Findlay, OH 45840
(419) 423-3526

O.S.C.O. Service Company, Inc.
202 Hill St.
P.O. Box 1203
Columbus, TX 78402

Oil Chem, Inc.
[illegible] 12th St.
Flint, MI 48503
(313) 235-3040

Olin Hunt Specialty Products
500 Carnegie St.
Rolling Meadows, IL 60008
(312) 259-4800

Painter Supply
311 S. Hamilton
Saginaw, MI 48602
(517) 792-1234

Palisades Park Country Club
RR #2
box 159-A
Covert, MI 49043
(616) 764-8166

Pat Perretti Freight Service, Inc.
335 Brown Trail
Hopatcong, NJ 07843
(201) 935-4363

Paul Duncan, Inc.
10702 29 Mile Rd. S
Albion, MI 49244
(517) 629-8895

Paul's Road Oiling Service
4240 Mass Drive
Port Huron, MI 48060
(313) 982-7271

Petro-Chem Processing, Inc.
515 Livernois Dr.
Detroit, MI 48214
(313) 824-3840

Petrochem Services, Inc.
P.O. Box 337
Lemont, IL 60439
(312) 739-1150

Polkow Oiling Sevice
1251 Moore Rd.
Hillsdale, MI 49242
(517) 437-2041

Power Vac Service, Inc.
3209 S. Pebble Creek
West Bloomfield, MI 48033
(313) 837-7670

Price Trucking Corp.
67 Beacon St.
Buffal, NY 14220
(716) 822-1414

Quanta Corporation
(Paul O. Sellers)
18530 Allen Rd.
Wyandotte, MI 48192
(313) 282-3044

R & M Trucking Co., Inc.
4,74 Webster
Monroe, MI 48229
(313) 381-0762

R.S. Liquid Waste Disposal
P.O. Box 3289-09
Providence, RI 01909
(401) 831-4320

Rahco Petroleum
36115 Goddard Rd.
Romulus, MI 48174
Rapid Parts Maintenance Inc.
36180 Groesbeck Hwy.
Mt. Clemens, MI 48043
(313) 792-1250

Recovery Specialists Inc.
P.O. Box 235
Saline, MI 48176
(313) 996-2626

Refinery Transport & Terminal
(Ray Holder)
3333 S. Greenfield Rd.
Melvindale, MI 48122
(313) 382-8500

Research Oil Co.
2633 Transport Rd.
Cleveland, OH 44115
(216) 621-8656

Ross Maintenance Corp.
550 E. Leonard
Leonard, MI 48038
(313) 628-5280

Robinson Pipe Cleaning Co.
2309 E. 28th St
Lorain, OH 44055
(216) 277-7473

Rocar Equipment Co.
P.O. box 486
Summit, IL 60501
(312) 563-2330

Rock Refining Co., Inc.
Route 1
Stratford, WI 54484
(715) 687-4198

Rogers Cartage Co.
10735 S. Cicero
Oak Lawn, IL 60453
(312) 425-9300

Rollins Environmental Services (PS)
P.O. Box 2349
2200 Concord Pike
Wilmington, DE 19803
(302) 478-2761

Rooney Contracting Co., Inc.
948 VanDyke
Bad Axe, MI 48413
(517) 269-7132

Ross Transportation Services, Inc.
394 Giles Rd.
Grafton, OH 44044
(216) 748-2171

Roy, E. Trucking Co.
20930 Pennsylvania
Taylor, MI 48180
(313) 283-7130

Ryder/PIE Nationwide, Inc.
P.O. Box 2408
Jacksonville, FL 32203
(904) 798-2076

S - J Transportation Co.
E. Millbrooke Ave.
P.O. Box 91
Woodstown, NJ 08098
(609) 769-2741

S & C Transport, Inc.
14703 Allen Rd. #5
Southgate, MI 48915
(313) 281-7318

S & W Waste, Inc.
115 Jacobus Ave.
S. Kearney, NJ 07032
(201) 344-4004

S. D. Myers, Inc.
P.O. Box 4754
Akron, OH 44310
(216) 929-2847

Safety-Kleen Corp.
655 Big Timber Rd.
Elgin, IL 60120
(312) 697-8460

Sales Corp.
d/b/a Sales Industrial Services
704 Convent
Monroe, MI 48161
(313) 241-2820

Sam's Trucking Corporation
6651 Eagle
Detroit, MI 48210
(313) 834-6600

SCA Chemical Services
1330 Balmer Rd.
Model City, NY 14107
(716) 754-8321

Scarpone, L.J. Company
457 Woodward
Dearborn, MI 48126
(313) 843-2900

Schneider Tank Lines, Inc.
3951 S. Ridge Rd.
P.O. Box 2336
Green Bay, WI 54304

Schultz Oil Service
436 Willoughby
Nason, MI 48854
(517) 337-1341

Sealand Environmental Services
326 Derby Ave.
Derby, CT 06418
(203) 735-1817

Sealed Power Corporation*
100 Terrace Plaza
Muskegon, MI 49443
(616) 767-5011

Sechan Limestone Industries
RD #1
Portersville, PA 16051
(412) 368-8715

Sedlock & Francisco, Inc.
13380 Telegraph Rd.
Flat Rock, MI 48134
(313) 782-5050

Seiler Tank Truck Service
P.O. Box 366
26791 W. Michigan
Albion, MI 49224
(517) 629-4810

Services Sanitaires, Blainville Inc
534 Coco St. Louis East
Blainville, Quebec
Canada J7B 4B5. (514) 430-1444

SET Liquid Waste System
750 Sumac Rd.
Wheeling, IL 60090
(312) 537-8221

Shoreline Waste Transportation Co.
(Bush Concrete)
2384 Airline Rd.
Muskegon, MI 49444
(616) 733-0835

Signal Delivery Service, Inc.
P.O. Box 7
St. Joseph, MI 49085
(616) 983-2508

Small Quantity Specialists
876 Territorial
Northville, MI 48167
(313) 349-2654

Smith Trucking Services
P.O. Box 1329
Steubenville, OH 43952
(614) 535-0551

Smith's Oil Service Co.
6041 Stanelin
Detroit, MI 48228
(313) 271-0338

Snow Environmental Service
11 St. Asaphs Rd.
Bala Cynwyd, PA 19004
(215) 667-1237

Sodergren Septic Service
R #1, Box 137
Lohsburg, MI 49649
(906) 466-4096

South Chicago Disposal, Inc.
11834 Doty
P.O. Box 17537
Chicago, IL 60617
(312) 978-7000

Southern California Chemical Co.
17415 E. Jefferson
Union, IL 60180
(815) 923-2136

Southwestern Michigan Dust Control
P.O. Box 152
Bloomingdale, MI 49026
(616) 521-7638

Spartan Chemical Co.
2539 28th St., SW
Wyoming, MI 49509
(616) 534-4921

Special Waste Systems, Inc.
14390 Wyoming
Detroit, MI 48238
(313) 491-4603

Specrserv, Inc.
75 Jacobus Avenue
South Kearny, NJ 07032
(201) 589-0277

St. Joseph Water Lines
5724 New Peachtree Rd.
Atlanta, GA 30341
(404) 452-1744

Stemmler Brothers Distributing
116 S. Sophie St.
Bessemer, MI 49911
(906) 667-0852

Stemberg Brothers
P.O. Box 127
Bark River, MI 49807
(906) 466-9908

Stoddard & Sons Co.
3456 12th St.
P.O. Box 426
Wayland, MI 49348
(616) 877-4263

Suburban Oil Company
28162 Meadowhill
Romulus, MI 48174
(313) 941-5812

Suburban, Inc.
441 Carleton S. Rockwood Rd.
Carleton, MI 48117
(313) 782-3829

Suffolk Services, Inc.
26 Tanner Street
Lowell, MA 01852
(617) 458-2500

Sun Ray Oil Co.
2320 S. Fraser Rd.
Kawkawlin, MI 48631
(517) 684-5270

Sunrell Production Services
4220 US 31
Box 36
Grawn, MI 49637
(616) 943-4179

T & R Electric Supply Co., Inc.
HWY 34 W.
P.O. Box 180
Salem, SD 57017
T & R Service Co.
Hwy 34 W
P.O. Box 197
Colman, SD 57017
(605) 534-3535

Tadbit, Inc.
P.O. Box 989
3800 Oak Harbor Rd.
Fremont, OH 43420
(419) 334-4407

Talaski Excavating
1697 S. Parisville Rd.
Harbor Beach, MI 48441
(517) 479-6532

Tank Transport, Inc.
20275 W. Good Hope Rd.
Lannon, WI 53046
(414) 251-3730

Tarnow Supply Co.
22167 Michigan Ave.
Dearborn, MI 48124
(313) 561-0061

Thomas (Frank J.) Road Oiling Serv.
4100 W. River Rd.
Muskegon, MI 49445
(616) 744-1893

Thomas Solvents Company of Muskegon
4321 East Evanston
Muskegon, MI 49443
(616) 777-2619

Three M Company*
Transportation Dept.
570-2-01 3M Center
St. Paul, MN 55144
(612) 733-0820

Titan Oil Co.*
1509 S. Senate
Indianapolis, IN 46225
(317) 632-3613

Tonawanda Tank Transport Service
1140 Military Rd.
P.O. Box H
Buffalo, NY 14217
(716) 875-9703

Total Petroleum Corp.*
E. Superior St.
Alma, MI 48802
(517) 463-1161

Total Pipe Maintenance*
2b859 Sunningdale
Inkster, MI 48141
(313) 562-7644

Total Pipeline Corp.*
East Superior St.
Alma, MI 48801
(517) 463-1161

Total Pipeline Corp.*
E. Superior St.
Alma, MI 48802
(517) 463-1161

Towne-Robinson Fastener Co.*
4401 Wyoming
Dearborn, MI 48121
(313) 581-3200

Transformer Inspection Retrofill
2704 Normandy
Royal Oak, MI 48073
(313) 548-4020

Tri-County Liquid Waste
3432 Gembrit Circle
Kalamazoo, MI 49001
(616) 345-0937

Tri-State Industrial Service
155 Race St.
Coldwater, MI 49036
(517) 278-2584

Tri-Way Management Systems, Inc.
36345 Van Born Rd.
Romulus, MI 48174
(313) 595-0630

Tricil (Quebec) Inc.
6785 Route 132
Ville Ste. Catherine, Quebec
Canada J0L 1E0. (514) 632-6640

Tricil (Sarnia) Limited
R #1
Corunna, Ontario
Canada N0N 1G0. (519) 864-1021

Tube Forming, Inc.*
P.O. Box 294
Chesaning, MI 48721
(616) 627-2642

U.S. Chemical Company, Inc.*
29163 Calahan
Roseville, MI 48066
(313) 778-1414

U.S. Pollution Control
2000 Classen Center
Suite 400 South
Oklahoma City, OK 73106
(405) 528-8371

Unison Private Truck Fleet
2727 Tuller Parkway, Suite 200
Dublin, OH 43017
(304) 747-2004

United Paint Service, Inc.
14303 Joy Rd.
Detroit, MI 48228
(313) 846-5200

Upjohn Company*
7171 Portage Rd.
Kalamazoo, MI 49001
(616) 323-5341

Usher Oil Service, Inc.
9000 Roselawn
Detroit, MI 48204
(313) 834-7055

Vac-All Services, Inc.
29830 Eaorse Rd.
Romulus, MI 48174
(313) 729-5510

Valley City Refuse Disposal
2650 Thermond SW
Wyoming, MI 49509
(616) 538-8699

Van Waters & Rogers
3000 Market
South Bend, IN 46614
(317) [illegible]-4811

Van's Tank Truck Service
3457 Marsh Rd.
Marine City, MI 48039
(313) 765-5587

Verreaux Oil Company
1580 Eastern, SE
Grand Rapids, MI 49507
(616) 245-2135

Vic's Waste Oil Service
27135 Haverhill
Southfield, MI 48076
(313) 557-3088

Vo Con
2018 Stefko Blvd.
Bethlehem, PA 18017
(215) 868-5800

VSI, Inc.
RD #2, P.O. Box 9
Brockway, PA 15824
(814) 265-1975

W. H. Special Sons Inc. d/b/a
Refuse Container Transportation
461 E. Clinton
P.O. Box 262
Elmira, NY 14902
Waste Acid Services
6520 Georgia St.
Detroit, MI 48211
(313) 571-7140

Waste Conversion, Inc.
2848 Sandarone Dr.
Harrield, PA 19440
(215) 822-8996

Waste Management of Michigan-
Grand Rapids
1660 Porter St.
Grand Rapids, MI 49509
(616) 538-3750

Waste Management of Michigan-West
16860 Van Born Rd.
P.O. Box 1360
Wayne, MI 48184
(313) 729-0700

Waste Management, Inc.
3003 Butterfield Rd.
Oakbrook, IL 60521
(312) 654-8800

Wastex Research, Inc.
2000 Broadway Ave.
East St.Louis, IL 62205
(618) 271-2372

Wayne Reclamation & Recycling
P.O. Box 467
Daniel Drive
Columbia City, IN 46725
(219) 244-7025

Wayne State University
625 Mallet
Detroit, MI 48226
(313) 577-1200

Waynetown Transport Leasing
206 Waynetown Rd.
Canonsburg, PA 15317
(412) 746-4650

WedTech of Michigan
400 Lake St.
Ontonagon, MI 49953
(906) 884-4483

Westinghouse Electric Corp.
300 North Curry Pike
Bloomington, IN 47401
(812) 332-4421

Will's Trucking, Inc.
3185 Columbia Rd.
Richfield, OH 44286
(216) 659-9381

Wolverine Disposal, Inc.
[illegible] Rawsonville Rd.
Ypsilanti, MI 48197
(313) 481-0070

Wolverine Oil & Supply Co., Inc.
[illegible] W. Chicago
Detroit, MI 48204
(313) 931-2336

Woods Contracting Co.
4403 N. Clare Ave.
Harrison, MI 48625
517) 539-2181

Worcester Industrial Service
2231 Liberty
St. Clair Shores, MI 48080
(313) 765-4550

Yerrington Construction Company
1055 North Shore Drive
Benton Harbor, MI 49022
(616) 429-9816

Yoder Trucking
G-5181 Dania
Flint, MI 48504
Zephyr Inc.
[illegible] Nelson Rd.
Muskegon, MI 49445
(616) 744-1637

Zabek, Albert
492 M-55
Tawas City, MI 48763
(517) 362-3791

Z-T, Inc.
660 Weber Drive
Leatherman Plaza
Wadsworth, OH 44281
(216) 336-8677